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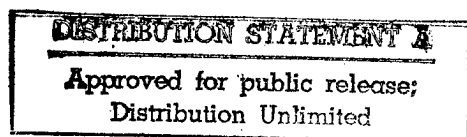


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Science & Technology

***Europe
Economic Competitiveness***



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SCIENCE & TECHNOLOGY POLICY

EC Priority For 'Generic' Technologies Linked to Fourth Framework Program

92BR0514 Amsterdam *COMPUTABLE* in Dutch
29 May 92 p 19

[Text] Luxembourg—In future European research programs more emphasis will be placed on generic technologies which can be utilized throughout a wide range of industries. These will specifically include information technology.

This was made clear on Wednesday of last week during an EC Ministerial Conference. Due to the absence of (the Dutch) Ministers J. Andriessen (Economic Affairs) and J. Ritzen (Education and Science), State Secretary P. Dankert (European Affairs) took part in the deliberations [representing the Netherlands].

The debate on European research policy was intended as a signal to the European Commission, which is preparing proposals for the Fourth EC Framework Program for R&D for the period 1994 to 1998. During this period support will be doubled, up to an amount of approximately 7 billion guilders per year. Programs such as ESPRIT [European Strategic Program for Research & Development in Information Technology] and BRITE/EURAM [Basic Research in Industrial Technologies for Europe/European Research in Advanced Materials] are included, but new programs which are intended to bring technology closer to the market will also be included in the framework.

Decisions still need to be made on the total amount of the financing and its distribution. There is dissension within the EC about the overall budget that the Fourth Framework Program should receive. Germany sees the need for more support, but feels it should be at the national level as much as possible. Great Britain would like to see less support, mainly because it is less enthusiastic about the single market. France is an advocate of expansion.

An important movement within the European Commission would like to see more emphasis placed on the stimulation of a number of leading technologies, such as microelectronics and car electronics. Several EC member states such as Great Britain, Germany, and the Netherlands are afraid that only a limited number of very large concerns would profit from this.

Germany: Riesenhuber Announces Research Institute Cutbacks

92MI0561 Bonn *DIE WELT* in German 4 Jun 92 p 21

[Article by Norbert Lossau: "A Radical Slimming Course for German Large-Scale Research—The Major Research Centers to Shed up to 1,900 Established Posts"]

[Text] Yesterday Research Minister Heinz Riesenhuber (CDU [Christian Democratic Union]) presented a report on the status of German large-scale research to the Bundestag Committee on Research, Technology, and Technology Impact Assessment. The central point of the paper was that between 1,700 and 1,900 posts would be cut back in the major research centers in the old federal laender by 1995. The three major research facilities currently being established in the new federal laender, the Georesearch Center in Potsdam, the Center for Molecular Medicine in Berlin-Buch, and the Environment Research Center in Leipzig/Halle, are not affected by these cutbacks.

This year, the 13 major research centers in the old federal laender will receive 2.3 billion German marks [DM] from the coffers of the Federal Research Ministry (BMFT)—this is still two-thirds of the funds that the BMFT spends on institutional funding. Riesenhuber is now proposing to freeze this sum until 1994—and he gives more than just financial reasons for doing so.

Riesenhuber expects these measures to increase the flexibility of German large-scale research: "The research centers will become slimmer, but also more muscular." And despite the praise that Riesenhuber has for the work of the major research facilities, he does appear to be entirely satisfied with the way things have turned out: "If everything had been completely in order, I would not have done what I have done the way I have done it."

Freezing overall funding resources naturally means a real cut in basic financing for the major research facilities. The result will be a reduction not only in material resources, but also in established posts. There will also be considerable differentiation between the various facilities. There will be winners and losers in the distribution of the Bonn funding cake. The Alfred Wegener Institute of Polar and Marine Research (Bremerhaven), the Society for Heavy-Ion Research (Darmstadt), the German Cancer Research Center (Heidelberg), and the German Electron Synchrotron (Hamburg) will enjoy the largest increases.

On the other hand the three former nuclear research centers in Karlsruhe, Juelich, and Geesthacht and the Society for Mathematics and Data Processing in St. Augustin must expect drastic reductions. Riesenhuber does not rule out the possibility of a 15 percent or "possibly considerably greater" reduction in posts becoming necessary in some research establishments.

Researchers Should Seek More Third-Party Funding

The Research Ministry plans to exploit national attrition due to retirement and mobility to reduce the workforce from its present 22,000 (15,600 of which are established posts). A total of 1,200 employees over the age of 58 are to be offered early retirement. Riesenhuber estimates that this will cost DM120 million, to be shared equally by the Research Ministry and the Federal Labor Administration. However there is still no binding agreement on this point with the Federal Labor Minister.

In order to bring young scientists into the research facilities despite the drastic plans for cutbacks, a portion of the posts freed in this way will not be abolished, but taken up by young research scientists. This will involve 50 percent of the established posts vacated through retirement, but only 33 percent of those released due to mobility.

In order to improve their financial lot, Riesenhuber strongly recommends the major research facilities to step up their efforts to attract private funding from industry and the EC. At present, major German research facilities receive only DM15.6 million from the EC (not counting Euratom). According to Riesenhuber, the third-party funding market is highly competitive, "But highly qualified research is equal to this competition."

All in all, Riesenhuber considers that the planned measures will increase the flexibility of the major research facilities and improve the quality of research. Research work that does not absolutely need to be carried out in a major research center, but could be performed just as well at a university, should be reallocated during a transitional period.

At the science press conference in Bonn, the chairman of the Committee on Research, Technology, and Technology Impact Assessment, Wolf-Michael Catenhusen (Social Democratic Party), reacted to Riesenhuber's plans with considerable criticism. Catenhusen cannot detect any long-term strategy in the report, which is more likely to give the false impression that it is merely addressing a transient financial problem lasting two or three years. Catenhusen, too, is not against a post reduction in principle, but wants it to be made on scientific grounds and not as an "expression of helpless floundering in the financial crisis, with neither a strategic idea nor an imaginative science policy."

Catenhusen calls for a broad-based assessment of the German research facilities by a panel of international experts as a basis for drafting a comprehensive structural strategy to be called Research 2000."

German Economics Minister Discusses R&D Budget for Eastern Laender

92MI0583 Bonn *DIE WELT* in German 13 Jun 92 p 10

[Text] The German Ministry of Trade and Industry is providing 292 million German marks [DM] in funding this year for industrial research and development, and innovation in eastern Germany. As Trade and Industry Minister Juergen W. Moellemann stated in Berlin on Friday, the goal is to reverse the trend of declining research activities.

Moellemann emphasized that the number of those working in the sector of industrial research and development in the new laender has decreased to less than one-third of the 74,000 employed at the end of 1990. In

order to maintain this R&D potential therefore the Ministry of Trade and Industry must provide subsidies for a transitional period.

According to a ministerial report, the R&D situation is especially critical in industries that have not yet been privatized. Problems are also being experienced by the research companies that are no longer part of the 57 corporations still controlled by the trust agency and that can only be partly privatized. Unfortunately, at the end of June the trust agency will no longer handle R&D issues from its central office in Berlin, leaving further talks about industrial research to the branch directorates and regional offices.

Moellemann further explained that R&D funding was necessary to complement the investments made in eastern Germany and was optimistic that the high level of investment funding in the new laender will be maintained until 1996.

The German Government is expected to make important decisions on 1 July 1992, with the approval of the 1993 budget and medium-term financial plan. Moellemann pointed out that public investments per capita in eastern Germany are currently 130 percent of investments in western Germany while private investments are only 48 percent.

Finances of Major German Research Institutes Reviewed

92MI0598 Bonn *TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN* in German 31 May 92 pp 2-4

[Text] The major research institutes are of special significance for scientific research in Germany. Owing to the financial scale of their budgets, they are an important factor in the budget of the Federal Ministry of Research and Technology [BMFT]. In 1992, major research institutes in the former federal territory will receive 2.3 billion German marks [DM] from the BMFT budget. They employ approximately 22,000 staff, of which approximately 15,600 are in established posts.

As long ago as spring 1991, the BMFT announced that the overall volume of basic financing for the major research institutes in the former federal laender could not be increased before 1994. Research Minister Riesenhuber, on presenting a report on the situation of the major research institutes in the unified Germany to the Bundestag Committee on Research, Technology, and Assessment of the Consequences of Technologies, stressed that this was the only way that the necessary flexibility could be retained for backing research. It was only by this means that, given the scarcity of funds, it would be possible, for example, to continue successfully with the assistance to small and medium-sized enterprises that was structurally so important. This planned hiatus in growth was the only possible basis for renewed freedom in new fields of activity in subsequent years,

with development of new facilities that might be necessary, including those in major research institutes.

In reality, the nominal constancy of the overall funds for the centers in the former federal laender until 1994 means a significant decrease in basic financing, and will lead to a considerable reduction, on the order of 1,700 to 1,900, in staff financed in this way. The centers are to receive additional funds to the extent that the scale wage increases exceed 3 percent in 1993 and 1994. In up to 12,000 cases, employees of 58 and over will also be allowed to take early retirement. Otherwise, the BMFT is working on the assumption that age and revenue fluctuations will be exploited to obtain the necessary personnel reductions.

Job opportunities can be created through increased recourse to third-party finance. "This is not easy," according to Riesenhuber, "because competition in the market for such finance is intense. However, efficient research can stand up to this competition. The EC support programs, which are growing in terms of finance volumes, open up additional opportunities here."

The centers have a specific achievement potential. Where major items of research equipment have to be used, where the scientific tasks place high demands on management in the leadership of complex, interdisciplinary teams, or where, in the public interest, long-term programs require major research capacities, they can carry out research better than anyone else. They should, therefore:

- Make major equipment available for basic research, and undertake basic research of a particularly demanding technical nature.
- Take a leading part in long-term national programs in such fields as space, polar research, fusion, and, in the future, geoscience.
- Tackle central problems of environment and health in the long term.
- In the field of technical development, deal with subjects of special public interest, particularly in the areas of environment-friendly energy supplies, environmental technology and preliminary research for future high-grade technologies of general economic importance, e.g., in information technology or biotechnology.

There are opportunities for savings where tasks have been completed or can be reduced, or where research does not have to take place within the framework of the particular financing arrangements of the major research institutes, but can also be carried out successfully at other establishments, e.g., the universities, or by industry. The BMFT sees opportunities for concentration, for example, in nuclear technology, underwater technology, materials research, and information technology.

Even greater coordination in environmental research will have to be attained by establishing main areas of emphasis among the centers. This must take account of

the development of considerable new capacities in the new federal laender, especially through the establishment of the Environmental Research Center in Leipzig-Halle.

Harsh changes and difficult internal decisions will have to be made in the centers in the next few years. Nevertheless, they will also be able to take on a series of important new tasks during these years, e.g., arctic research, applied tumor virology, research in the area of hydrological cycles and environmental technology, stratospheric chemistry, fuel cells, diagnostic procedures in medicine, photovoltaic and photochemical solar conversion processes, and microsystems technology.

All in all, this gives the centers a clear image for the future. Without the major equipment, the infrastructure, and the staff of the centers, neither a top international position in wide areas of physics, nor the German contributions to internationally important polar research, fusion, space, and, in the future, geology programs, would be conceivable. Ever greater prominence is being given to solving pressing questions in central areas of environment and health; the contributions to technological development are being concentrated on a few "strategic" areas.

Three new major research institutes in the new federal laender will greatly strengthen science in Germany. The Geo-Research Center in Potsdam closes a gap in research into the entire geospheric/biospheric/atmospheric system, investigation of which will play a crucial part in deciding the future of our planet. The Max Dellbrueck Center for Molecular Medicine in Berlin-Buch is set to formulate the bases of our knowledge of the genesis and progression of disease, in order to create new treatments. In the Leipzig-Halle Environmental Research Center, the increasing worldwide problems of the polluted industrial landscape are to be tackled using the local region as an example. Aside from the three new major research institutes, eight field centers of other major research institutes have been opened in the new laender.

Backing for the centers in the former federal laender is increasingly coming up against tax problems that call into question the actual level of funding available to the centers and create legal uncertainties. The reason is the attitude of some internal revenue offices, primarily in North Rhine Westphalia, that are abandoning a practice that has gone uncontested over many years, and making finances given to the centers by way of grants from public funds liable to income tax, challenging their charitable status, this despite the unchanged legal position. The BMFT regards the resultant effective reduction in the research funding that has been voted in by parliament and government as intolerable. Clarification of the law is necessary in the interests of all those involved.

In difficult discussions, the BMFT and the major research institutes in the former federal laender have given their early attention to facing up to the challenges

of these years. To varying degrees, the centers have had to accept considerable reductions in their budgets. There are difficult years ahead, but they now have a solid foundation from which to tackle the necessary internal restructuring processes.

From 1995-96 onwards, all the centers are to participate once more in the overall growth of the BMFT budget by

way of increased funding. However, the consequences of further technical decisions and evaluations, e.g., by the Science Council, will lead to widely varying developments for the individual centers. Progress is being made in the creation of new centers and sites in the new federal laender, setting the scene for an efficient major research environment, well prepared for the challenges of the future.

Summary of the Differing Plans for the Various Types of Major Research Establishments

1. Those with special, subject-related need for growth

AWI [Alfred Wegener Institute] for Polar and Marine Research	Expansion of arctic research in connection with global change and climate
DESY [German Electron-Synchrotron]	Commencement of hadron-electron ring accelerator operation
DKEZ [German Cancer Research Center]	Development of the priority field of tumor virology and setting up of clinical cooperation groups
GSI [Society for Heavy Ion Research]	Taking over SIS [State Engineering School] operation

2. Those extensively subject to financial ceilings up to 1994

DLR [German Aerospace Research Institute]	As a long-term national program, space research must be governed by the financial framework. In the industry-related areas of aeronautics research, more emphasis on profit-sharing, streamlining up in the medium term by Europeanization
GBF [Association for Biotechnology Research]	Important field as key technology and as basis for medicine and environment, but new goal-definition and new planning phase
GSF [Research Center for Environment and Health]	Concentration especially on environment, against a background of objective-setting by combined research and new facilities in the new federal laender. Priority is interaction between environment and health
HMI [Hahn-Meitner Institute]	Securing BER II [Berlin telecommunications project] operation, concentration on structure research and energy conversion as new points of emphasis, with rundown of nuclear physics
IPP [Institute for Plasma Physics]	Priorities must be decided in order to limit financing in the state-run long-term fusion program

3. Those undergoing particular changes in terms of fields covered, and therefore with financial ceilings and, in some cases, decreasing budgets

GKSS [Geesthacht Research Center]	Rundown of underwater technology in view of lack of satisfactory user link-up, and of reactor safety research. Concentration on environmental research (energy and hydrological cycles), environmental technology and materials research
GMD [German Society for Mathematics and Data Processing]	Concentration on a few key major institute-specific fields in data processing/information technology
KFA [Juelich Research Center]	High-temperature reactor discontinuation and withdrawal of marginal topics imply consequences for the fields covered. Increase in third-party financing, especially from EC, concentration on basic research subject areas
KfK [Karlsruhe Nuclear Research Center]	Concentration on main areas of energy, environment, and microsystems engineering; consequences arise from termination of work in nuclear technology

Industrial Research in New German Laender Surveyed

92MI0599 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
31 May 92 pp 12-14

[Text] The structural changes in the new German laender have also affected industrial research and development. Companies are dismantling R&D facilities that the GDR had set up for reasons of self-sufficiency. Faced with considerable problems of production, marketing, and finance, these companies feel compelled to concentrate for the time being on activities that will be profitable in the short term.

At the end of 1989, there were 87,000 people working in industrial R&D in the former GDR. According to

detailed investigations by the German Science Endowers' Association, numbers at the end of 1991 had probably fallen from 35,000 to 40,000. Research concentrating mainly on large-scale enterprises (ex-combines) come up with lower figures (29,000 R&D employees). However, this does not take account of new R&D jobs, especially in small and medium-sized enterprises. Calculations based on R&D capacities determined by the Trust Agency for its companies, and information obtained in the programs run by the BMFT [Federal Ministry of Research and Technology], support the figure of approximately 35,000 to 40,000 R&D jobs in the new federal laender.

With a volume of approximately 430 million German marks [DM], the BMFT's aid programs for the economy

are alone contributing to the securing of approximately 11,000 jobs in R&D in the new federal laender in 1992. The vast majority of these are permanent posts, e.g., jobs in newly established technology-oriented enterprises, or new positions for research staff in small and medium-sized enterprises. As a result of bridging financing provided under the "Upturn for the East" [Aufschwung Ost] program, and of the backing for contract research, R&D capacities at the research companies will be exploited, and targeted at greater market orientation.

As agreed with the BMFT, the Federal Minister for Economic Affairs will also steer approximately DM250 million into the new federal laender in 1992, thereby contributing, at a rough calculation, to the retention of a further 5,000 R&D jobs. Since the Trust Agency expressly takes account of R&D efforts and the retention of R&D capacities in denationalization, the necessary degree of attention and state backing are now being directed at industrial research.

In doing this, the BMFT is concentrating on measures:

- To build an industry-relevant R&D infrastructure
- To increase technological competitiveness
- To establish new, technology-based companies
- For technology-related aid to small business.

The package of measures, extending to approximately DM350 million in 1992, is being taken up enthusiastically by business in the new federal laender.

The development of an economically relevant research infrastructure is thereby playing its part in ensuring that enterprises can already call upon innovation consultants from any Chamber of Commerce, and that access to databases for employees and field centers in the new federal laender is assured, as well as being simplified by the use of information agencies in Halle and Leipzig. The seven centers for information and consulting in the new fields of technology (CIM [computer integrated manufacturing] and plastics technology) offer the small business starting points where information and advice about the state-of-the-art can be obtained.

The nine independent research institutes and 12 field centers that make up the FhG [Fraunhofer society] have already proved to be particularly promising. They were established on 1 January 1992, but had, for the most part, started work before then, creating around 1,000 application-relevant R&D positions. The FhG establishments are prepared to take on contract research for trade and industry on the spot in the new federal laender. Important fields such as polymer, electron beam, and plasma technology, applied optics, and precision mechanics have been added to the FhG's research spectrum. These are fields in which the new federal laender have particular skills, as well as extensive requirements.

Top priority must be given to making sure that companies are competitive technologically. Under its specialist programs, the BMFT assists companies and research institutes by backing projects in such fields of technology

as environmental research and technology, basic IT [information technology], renewable energy sources and rational energy usage, materials research, and the improvement of working and living conditions. Around DM750 million worth of project finance is available for the new laender for 1992. Approximately 40 percent, i.e., DM300 million, will probably benefit enterprises, around DM240 million of this being earmarked to back R&D projects. By 1991, DM140 million was paid out in assistance of this kind, primarily for multipurpose projects in which technology will be raised to an international level via collaboration with western partners. In 1992, these funds will secure 5,300 man-years of R&D activity.

Owing to the special situation of the disincorporated research enterprises, the BMFT has also made DM80 million finance from "Upturn for the East" funds, as bridging finance for around 250 projects in 1992. This backs up the efforts of the Trust Agency, the Federal Ministry for Economic Affairs, which has itself expended DM100 million for the purpose, and the laender, in supporting the personnel capacities in these particular enterprises, which are especially threatened. The research companies also profit to a considerable extent from taking on contract research work.

The BMFT has achieved especially great success and lasting effects in the area of backing for the establishment of technology-oriented new companies. As a result of agreements made with the Minister of Research and Technology of the former GDR, and at the instigation of the BMFT, a start was made as early as June 1990 on aiding the development and expansion of technology and entrepreneur centers, and supporting the establishment of technology-oriented enterprises. After 23 months of backing, 13 of the 15 technology and entrepreneur centers assisted by the BMFT in the development phase are fully operational. A total of DM32.5 million in grants for this purpose was authorized by the BMFT. This helped in the creation of 16,000 m² floor space for 225 new companies, which are today already responsible for 1,000 high-grade jobs. In the final stage (1993), this backing, which will then amount to approximately DM40 million, is aimed at creating 77,500 m² floor space for 500 to 600 new companies with 5,000 to 6,000 employees. In addition, there are 10 additional centers that were assisted by the BMFT in the planning phase only. Roughly half these centers are now operational. Here expansion took place with the assistance of considerable internal funding or funding from the EC. What is particularly pleasing is that the new laender are now developing 15 further technology and entrepreneur centers on their own account, and these are expected to go on line in the next two years.

The new federal laender will then possess a comparatively large number of technology and entrepreneur centers, which is an important prerequisite if small business is to be dynamic and innovative.

The model experiment on establishment of technology-oriented companies (TOU) has also been taken up to a suprisingly great extent by the founders of new companies in the new federal laender. As of 31 March 1992,

576 concepts for new establishments had been submitted. These concepts were then written up as aid applications within the comprehensive establishment consultation provided. The establishment of 82 new companies (34 conception phases, 56 R&D phases) has already been assisted to the tune of DM43.2 million. A further 200 applications are currently being processed. With this program alone, around 400 new jobs have been created for researchers and developers.

The aid given by the BMFT for restructuring of industrial research in the new federal laender is supplemented by the finance available for the technology-related backing of small business. Since September 1990, more than 1,050 companies and research institutions have been supported in taking on research personnel (ZFO program) and awarding or executing development contracts (AFO and AWO programs).

Over 19 months, the BMFT has assisted 400 companies in taking on 1,200 employees in R&D with ZFO [research staff incrementation support]. Of these, 280 companies with 830 newly-appointed R&D staff have received assistance in the last nine months alone. So far, DM14.5 million (DM2.2 million in mid 1991) has been awarded after a processing period of only four weeks, and a further DM10 million and DM2.2 million have been allocated for 1992 and 1993 respectively, as, from 1992, the rate at which the BMFT supports the newly-appointed employees for 15 months from the appointment date is 50 percent (formerly 70 percent and 60 percent).

The AFO program [contract research for the East] makes it easier for enterprises in the new federal laender to gain access to foreign expertise. The BMFT bears 50 percent of the contract cost, and awarded more than DM36.5 million in aid for 465 applications from 346 companies (just under DM17 million—mid-1991). The overall aim of these measures, which will continue until the end of 1993, is for approximately 2,000 awards. To date, around 2,500 jobs in R&D have been secured, at least temporarily, in the new federal laender as a result of this measure alone.

The AWO program [West/East contract research] was introduced in 1992 in order to direct R&D contracts to the new federal laender, where facilities, which are sometimes excellent, are not fully exploited. Of 221 applications so far, 165 grants have already been made to 150 contractors, following a checking period of four weeks, with grants totaling approximately DM10 million (an aid quota of 35 to 40 percent). This aid will enable those offering R&D to penetrate the hotly contested market for such services in the West by lowering their prices, and to obtain reference contracts. So far, 500 R&D jobs have already been secured, at least temporarily, by this means.

In 1992, around DM65 million is available for the three programs last mentioned. It is anticipated that these

programs will continue to be taken up enthusiastically by developing small businesses as an aid to self-help.

The indirectly specific CIM program, which was initiated in 1992, is also aimed at small business. Already, 184 applications for DM46 million in grants have been received. In total, DM100 million is available until the end of 1995.

As regards the research infrastructure, support for innovation in small business, and project-related support for industrial R&D undertakings, the BMFT has contributed to a perceptible improvement in the position of the new federal laender. Around 11,000 R&D jobs—arising as a result of the individual programs—are being supported with BMFT assistance in 1992 alone. This represents roughly every third job in R&D in the new laender. However, it is still crucial for the future of the economy of the new laender that, on their own initiative, the enterprises themselves give to R&D the priority that is due in a high-tech country open to world trade.

Restructuring, Finances of Max Planck Society Noted

92WS0606A Munich SUEDEDEUTSCHE ZEITUNG in German, 6-8 Jun 92 p 33

[Article by Christian Schuetze]

[Text] The inevitable cruelties which follow a change in regimes should take place as rapidly as possible—this was the recommendation of the French master diplomat, Talleyrand. After the unification treaty the structures for science and research needed to be transferred from the old federal republic to the new states. The Max Planck Society for the Advancement of Science has carried out its share of this task not overhastily, but with dispatch. The 25,000 workers of the Academy of Sciences of the GDR could not be "taken on" by the Max Planck Society. The Society waited for the recommendations of the Council on Science concerning the renovation of science and research in the new states with regard to content, developed concepts for new institutes, examined scientists from the institutes of the Academy of the GDR, and formed 28 work groups at seven eastern German universities and colleges. Within several years these are supposed to get the research underway, which in the GDR had been reserved for the Academy; at the universities only teaching had been carried on. The separation had made the system easier to handle politically.

The work groups include a total of approximately 280 former Academy scientists. They will be looked after by the partner-institutes of the Max Planck Society. When the examination committees of the Max Planck Society approached the GDR academicians, extreme mistrust prevailed. Today this no longer exists between the western and eastern coworkers of the Max Planck Society, according to the statement of its Vice-President, Walther, of the Garching Institute for Quantum Optics.

In November 1991 the first Max Planck Institute was founded in one of the new states—the Institute for

Microstructure Physics in Halle. The 100 workers come from the former renowned Academy institute. The Institute for Colloid and Interface Research in Berlin-Adlersdorf began work on 1 January 1992. Here also a large part of the workers come from the former Academy institute.

The 43rd main meeting of the Max Planck Society in Dresden thus went off without major internal conflicts. The President of the Society Hans Zacher said in the final meeting in the Dresden Theater that there still existed a sudden danger to the research system in the Federal Republic, which was in fact a sensible and successful one. The necessities of research were conflicting increasingly with new moral concepts of society. There was considerable fear that research was destroying the environment, yet protection of the environment, in its turn, required research. Politicians were trying to bring spectacular accusations against research. Zacher begged therefore that politics might allow the basic values of our society and its constitution to breathe freely.

A greater part of the president's speech was taken up by the question of money. Since 1972 there had been no increase in resources in the Max Planck Society, and in the quantitative conditions of research "real stagnation" reigned. The closing of institutes or departments whose tasks had been completed was not bringing in sufficient available funds for the adequate provision of personnel and equipment for new areas of work. In respect to buildings and equipment, research had fallen behind since the 1980s—which in the 1990s would become a danger. The increase in wage settlements and welfare charges was allowing personnel costs to rise at the cost of investments. At the same time the increase of these was necessary in order to accommodate the qualified members of the younger generation, who were crowding forward in large numbers, to utilize the replacement prospects which resulted from the large-scale pensioning-off of older researchers, and to achieve uniformity in the sphere of research and a similar level of development in East and West.

The guarantee which was given in 1989 by the heads of the states and by the federal government that the Max Planck Society and the German Research Community would receive a 5 percent increase over the course of five x years—which seemed to indicate real growth—caused the Max Planck Society to establish three new institutes. However wage and price trends had destroyed the gain. The Society was in a "unique bottleneck." The reserves of the institutes were exhausted, and an internal equipment replacement program had fallen victim to the shortage of funds. "The qualitative development of the Max Planck Society is in serious danger."

In order to promote the "normality of university research" within the research system of the Federal Republic, the Max Planck Society had set up work groups at the universities of the new states. But the Society wished to hold to its specific instrument—the

institute. Accordingly, in addition to the two new institutes which had just been founded, three more were under discussion. Thereby "the research picture in Germany should become not only uniform, but also meaningful for the future."

Zacher warned against a "continuous process of erosion of the German research system as a result of European dynamics." In Germany research support was marked by the autonomy of science. European research support, on the other hand, worked with bureaucratically developed programs, in which "science still played only a marginal and consultative role." Even the Max Planck Society, as a result of European developments, would be faced with the question as to whether the support of pure research would remain one of the household goods of national policy. Zacher closed, however, on an optimistic note, and praised the workers of the Max Planck Society in the new as well as the old federal states for their competence and demonstration of responsibility.

The Prime Minister of Saxony, Kurt Biedenkopf, called the fact of the 43rd general meeting of the Max Planck Society in Dresden "a piece of consummate unity." It showed that the new federal states in terms of planning for the future were included into all spheres, not only into politics and science. He advised the research institutions and universities to work more intensively on the unification process, an event of the type which only happened every hundred years. Federal Education Minister Rainier Ortleb asked the Max Planck Society to work intensively on the common research picture, and "to move the evolution forward in such a way that there would be no taste or aftertaste." Scientists from the GDR were to be integrated, and the structures were to be repaired with tact. Dresden's mayor, Herbert Wagner, recommended Dresden as a gateway and a bridge to the East, and as a conference site which would win fame not only through painters, musicians, and writers, but in which science and technology must also not remain hidden.

Italy: Research Minister Sees Need for More Funding

92MI0607 Milan *ITALIA OGGI* in Italian 26 Jun 92 p 32

[Article by Marcel Vulpis: "Research Stumbles Over Funding"]

[Text] The scientific and technological research situation in Italy is a difficult one yet the many shortcomings in this sector can be overcome, especially in medium term. These are the conclusions that may be drawn from a ministerial report on scientific and technological research in Italy and from the 1992-94 three-year plan presented by Minister Ruberti. This plan, provided for under Article 3 of Law No. 168/89, is closely related to the report on the status of research and takes into account the responsibility of CIPE [Interministerial

Committee for Economic Planning] and CNST [National Science and Technology Council] in this area.

A nation's competitiveness is determined by its technical and scientific potential; therefore in the next few years, human resources will play a crucial role in the development of the entire "research system." Consequently the increase in the number of those employed in both the public and the private research sectors from 61,191 in 1967 to 135,665 in 1988 has not been fortuitous. This number includes, however, both employees with other duties (22,545) and technicians (38,287) while the number of researchers comes to 74,833. At European level, Italy has a low ranking with 29 researchers per 100,000 employed compared to 56 in Germany, 45 in France, and 53 in Norway.

Until the 1980s, Italy allocated 0.75 percent of GNP to research (in the 1970s this figure was 0.87 percent). Later, however, with the increasing awareness of the importance of research the amount of GNP allocated to R&D activities reached 1.24 percent in 1989 and 1.45 percent in 1990. Nevertheless, Italy remains one percentage point below the European average (2.5 percent of GNP).

An analysis of the evolution of R&D expenditure in the seven most industrialized countries, reveals that Italy's share of expenditure over 1970-88 increased more than one-fourth when compared to the other partners. However, with such a low starting rate Italy's share remains 3.4 percent of the total.

Italy only ranks 17th among the 24 OECD countries both for the percentage of GNP allocated for R&D expenditure and the percentage of researchers in the overall workforce.

Another interesting figure is the predominance of public investments (54 percent) over private investments (approximately 45 percent of the total). The remaining share (6 percent) is invested in southern Italy, which lags far behind even in the sector of technological and scientific research.

Italy's shortcomings involve various sectors: from "data processing support to logistic structures to management and promotional services." Ruberti feels Italy can recover, but only by achieving a new balance through "a planned expansion of resources that is compatible with the increase in GNP and the need to upgrade the manufacturing system."

What future scenarios does the minister see?

There are two alternatives: First, a 3.4 trillion lire investment in the first year, to reach more than 8 trillion lire after 10 years. Second, the starting point would be 2.8 trillion lire to reach over 10 trillion lire after 15 years (here the average increases to 5.7 trillion lire per year). These two alternatives could be implemented only with a massive contribution by the manufacturing sector (both

public and private companies) and a greater insight by parliament and government.

Therefore, these two bodies will be required to implement these programs "indicating at the same time how activities should be expanded in various sectors. However, should R&D expenditure be maintained at an annual inflation level of 6.2 percent in coming years, R&D expenditure would once again fall below 1 percent of GNP by 1995," concluded Minister Ruberti. This would mean a definitive retrocession of Italy among the less advanced countries.

Instead, by remaining on a par with Europe, Italy could overcome many of its handicaps faster; this is an indication therefore, that research is more than ever of vital importance in the development of any industrialized country.

Italian Science Park Association Described

92MI0616 Turin MEDIA DUEMILA in Italian Jun 92
pp 80-85

[Article by Laura Capuzzo: "Science Parks: A Meeting Place for Science and Industry"]

[Text] There are more than 200 throughout the world, with a similar number about to be established. Already well-known in countries such as France, the UK, and Germany, not to mention the United States and Japan, during the past 10 years science parks have also begun to make an appearance in Italy. They are seen as the key to closing the distance between the research and business worlds that often prevents significant innovations from ever reaching maturity.

Of the many paths that can be followed in the name of progress, science parks would seem to be the one leading toward the future, toward overcoming a line of reasoning that if followed to conclusion, can lead to isolation and put a stop to industrial development. In our country, however, uncertainties and doubts continue to exist—especially at a decision-making level—as to whether this really is the right direction to follow. There is still much work to be done before what are currently isolated attempts—some in an advanced stage—can be translated into a general strategy capable of making an effective contribution toward the recovery of Italy's competitiveness on the international markets.

This is one reason why the Association of Italian Science and Technology Parks (APSTI)—recently constituted to bring together the main players involved in exploiting the factors that form the basis of innovation—does not have an easy task ahead. With the association, basic research and training, especially at university level, industrial activities, and institutes, should find a common meeting ground on which to bring together a variety of geographical, scientific, cultural, and economic factors.

Not an easy task, especially when the behavior of the two main protagonists is taken into consideration as well as the mutual accusations that they habitually make. Industries have often failed to stimulate research by buying elsewhere—at extremely high prices—new technologies that are indispensable if they are to remain competitive. The research sector instead has too often shown itself to be remote from industry, and incapable of developing programs that focus on the industrial sector or on its development. Too often, it has not even seen the necessity of considering the cost/benefit ratio when using the resources available.

The idea of creating APSTI, which for the first three years will have its legal headquarters at the Area Science Park in Trieste, came from a group of organizations with a vast experience in promoting and managing the synergies between research and development. At the head of the association, because of its multidisciplinary nature, is the Area Science Park of Trieste from whose upper echelons comes the association's president Prof. Domenico Romeo. It is supported by the following organizations: the Tecnocity Association which is backed by the Agnelli Foundation and operates within the technological triangle of Turin, Ivrea, and Novara; the Pirelli Bicocca Project organization, which is reclaiming the Bicocca area with a series of R&D and training projects; the Leonardia consortium which, with the support of the Mandelli Group—a world leader in industrial automation—is establishing a technological role in the Piacenza area; the Genoa Research Consortium, the first Italian research consortium to be formed by a city; the Tecnopolis Csata Novus Ortus Consortium, which operates the scientific park in Valenzano, near Bari; and AGENI, the ENI [National Hydrocarbon Corporation] development agency.

Other components involved in the setting up of various new initiatives have since joined this initial list of founding members: Lingotto of Turin, which is presently involved in transforming the building that bears its name into the most advanced example of an "intelligent building" in Europe; Soprip, a public-private company which is establishing a science park in Parma; the San Raffaele biomedical science park in Milan, which is working on a project to place existing high-level scientific and biomedical potential at the disposal of industry and of public and private companies; a company in Naples, which is drafting a pre-project feasibility study for a science park in Calabria; and the Ventuno consortium of Cagliari, a regional authority established to promote and operate Sardinia's science park.

"As can be seen," said Prof. Romeo, "the association has among its members private and public organizations, from northern and southern Italy. It is also significant to note that behind several of the members are some of Italy's leading industrial groups that have just begun to show an interest in joint research, and this should be underlined. In fact, these big groups often tend to solve their problems internally in their own first-rate research

centers and avoid any collaboration, whether on a national or an international level."

According to Prof. Romeo, another aspect to be considered is the role of Italy's small and medium-sized industries for whom the percentage cost of technological innovation is much higher, than it is for the big companies. "It is my impression," he says, "that the presence of small and medium-sized industries in sectors such as robotics, sophisticated instrumentation, biotechnology, and advanced materials is very important. Closer ties between these industries and national research facilities particularly those operating in science parks would certainly increase their impact on the international market."

The association's primary objective is to bring about a reversal in the current policy on innovation at central and local government level. As APSTI Secretary General Prof. Bruno Bottiglieri said: "In Italy, the few political instruments that are used in this regard, are outdated and the presence of parks is still interpreted wrongly as EC support for industries. The government, ministries, regional authorities, and various financial institutions, should instead, realize that science parks represent the central element in any industrialized country's policy on innovation. "There are two main reasons," continued Bottiglieri, "why a proper government policy, as can be found in other major industrialized countries, is needed to coordinate the development of science parks. First, to encourage the growth of science parks in areas where the basic prerequisites for success already exist such as those economic areas where production, basic and applied research, and advanced training schemes are well assimilated. Second, to prevent a generalized mismanagement of resources caused by a useless proliferation of fragmented, localized projects."

According to Bottiglieri the recent agreement signed between the Ministries for the Southern Italy Research, and the Treasury, with the support of the Ministry for State Shareholdings, to provide over 1 trillion lire in funding for the promotion and establishment of science parks in southern Italy is of particular importance. "If implemented properly," said Bottiglieri, "this could represent the key to a completely new way of perceiving the role of parks in underdeveloped areas, to the extent that it could serve as a model for national projects."

The APSTI also hopes to become a reference point for the promotion, enhancement, and development of technological districts, defined as being metropolitan or subregional geographical areas that contain all the elements of an industrial district and a science park. Another project is to set up training programs on how to organize and run science parks. This is an area where everything has still to be learned, but during the past few months the association has already demonstrated its expertise by organizing its first training course for around 40 science park managers at the Area Science Park in Trieste. Finally, of fundamental importance will be its ties with other national associations in Europe

(four at present, in France, the UK, Spain, and Finland), and with similar international organizations, for the exchange of information on objectives, progress, and the results achieved by members.

An international conference will be held in Genoa at the end of October to conduct an in-depth study into the experiences of other countries. "We are also making plans for bilateral activities, possibly at EC level," said Prof. Romeo, "with the United Kingdom Science Parks Association (UKSPA), which represents tens of British science parks." "Finally, we are about to reach an agreement with the International Association of Science Parks (IASP) to coordinate our strategies, both in terms of cultural promotion, and in terms of our presence on the international scene."

[Box Insert]

The APSTI Board of Directors

President	Prof. Domenico Romeo (Area Science Park)
Secretary General	Prof. Bruno Bottiglieri (Tecnocity Association)
Dr. Alvise Delugan	(Ageni S.p.A [Inc.])
Dr. Alberto Giordano	(Lingotto S.r.l. ["limited liability partnership"])
Eng. Mario Marinazzo	(Tecnopolis Csata Novus Ortus)
Dr. Giovanni Nassi	(Pirelli Bicocca Project)
Prof. Sandro Pontremoli	(Genoa Research Consortium)
Eng. Domenico Taraschi	(Leonardia Consortium)

[Box Insert]

Lingotto

When inaugurated in 1920, the Lingotto was a unique building: The biggest mass production factory ever built in Europe. Its size, its vertical construction, the test track on the roof, immediately made it a symbol of technological progress. During its 60 years of manufacturing activity, its workshops produced the Balila, Topolino, 500B Giardiniera, Campagnola, 124 Sport, and Lancia Delta automobiles.

Now the Lingotto will become a multipurpose center, dedicated to innovation, and an important reference point for numerous manufacturers and users of high technology.

The close tie with technology is not (just) a tribute to its past, but response to a specific need: the development in this part of Europe, of an integrated center "designed" to promote innovation. Technology is the guiding principle behind the various activities carried out in the building.

Innovation comes from the development of a critical mass of factors; first among these is communication and interaction between tertiary services and industry,

research and markets, the academic world and the workplace. Activities in the new Lingotto building will involve research work (private and university centers, an incubator for the development of new businesses and products), the exchange of information (meetings, conferences), and fairs and exhibitions.

[Box Insert]

Area Science Park

The Area Science Park in Trieste, which comes under the auspices of the Ministry for University Education and Research, is the result of a specific decision made by the Italian Government during the 1970s to establish a science park that would become a national reference point for the promotion of high-technology research. The park, which became operational at the beginning of the 1980s, has reached extraordinary levels of development during the past four to five years.

The Area Science Park currently extends over some 25 hectares, that will soon become 150 hectares as a result of new urbanization projects. It houses national and international research centers and companies, employing a total of 400 researchers in the 17,000 square meters of laboratories and offices placed at their disposal. The multifaceted nature of the activities carried out at the science park, promote the exchange of valuable information and experiences among researchers. Activities range from physics and advanced materials to biotechnology and computer science.

Research activities have been launched here as a result of the support given by the Area, which provides laboratories, equipment, services, and, in some cases, funding for individual research projects. In addition, Area promotes collaboration between public training organizations and the research and industrial worlds, acting as a reference point for contacts between university institutes, the CNR [National Research Council], INFN [National Institute for Nuclear Physics] etc., and industries, promoting the development of mixed projects. It also encourages technology transfer in the form of new processes and/or new products as well as the development of projects using this know-how through close collaboration with "incubators" such as the Business Innovation Center of Trieste.

[Box Insert]

Leonardia

Leonardia was established to take full advantage of the competitive potential of the Piacenza area. In so doing it joined other leading-edge areas in Europe where parks, and science and technology centers are an important component in the development of the factors that form the basis of the phenomenon known as "innovation." Leonardia will consist of a series of functional structures that are designed to provide an answer to three specific competitive needs: training in new skills, innovative management, and advanced services. Consequently, the

following centers have been established at Leonardia: the Industrial Liaison Center (School for Post-Diploma Specialization School, School of Postgraduate Studies, conferences, and seminars); the business and Innovation Center (an incubator for new business and marketing, financial, and technical services); the center of excellence (research centers, service centers, and cultural activities).

[Box Insert]

Tecnocity

The Tecnocity Association was established in 1985 by the Agnelli Foundation and leading companies, banks, and associations in the Piemonte region. Its goal is to promote the development of the Turin-Ivrea-Novara technological triangle.

The association's primary areas of interest are:

- to improve the availability and quality of continuing education with particular emphasis on the university, polytechnic, postgraduate courses, and advanced studies;
- to improve the efficiency of basic and applied research, and the mechanisms for the diffusion of innovation, all in order to promote the development of technological and scientific centers, which provide a favorable climate for the evolution of innovative industries;
- to upgrade communications and telecommunications infrastructures in Tecnocity, and between Tecnocity and the surrounding areas in order to improve contacts among the enterprises operating in the area and to increase contacts with other high technology centers throughout the world;
- to promote an industrial policy that caters to the special needs of technological districts;
- to search for all areas of possible collaboration with public institutes in the sectors mentioned above and particularly sectors that focus on improving the quality of life and the environment;
- to promote Tecnocity and its capital, Turin, both in Italy and abroad by highlighting its human, technological, productive, and environmental resources in order to underline its role as one of Europe's leading areas.

[Box Insert]

AGENI

AGENI, which was established in 1984, combines all the reorganizational experience acquired by the various companies within the ENI group, and especially through the reorganization of the textile and clothing industry, the work carried out in the former mining site on Mount Amiata, and the science park project in the Basento valley.

AGENI is currently involved in drawing up and carrying out integrated reorganization and development projects for underdeveloped areas particularly in southern Italy.

The most important projects concern the industrial and occupational reorganization of Sardinia's mining areas, a science park project for Salerno, and several projects to establish science parks in various other regions in Italy, even in collaboration with IRI [Institute for the Reconstruction of Industry].

AGENI's primary concerns are the development of new industrial initiatives, integrated projects for company and territorial reconstruction, and integrated projects for economic growth and innovation in depressed areas. The agency is able to provide a large variety of services—with the collaboration of the ENI group, which is called upon when required—from the preparation of preliminary studies to define the scope of science parks, the identification of technologies and production processes to be given support in the area, the choice of specific measures to be taken and of the public and private bodies to be involved, to the various activities connected with the construction of the parks themselves.

An outstanding aspect of the AGENI model for the development of new and existing enterprises is the Technological Incubator, or Technological Center for Business Innovation and Development (CTIIS). The center differs from other similar structures involved in setting up businesses in that it focuses on offering assistance, technological information, and prototype development as a result of synergies developed with ENI that are the driving force behind the AGENI model.

In addition, to ensure an adequate flow of know-how to businesses and the areas where it carries out its activities, AGENI is putting the final touches to a network of national and international technological skills and know-how with universities and research centers, science parks, and other structures. This network will provide information that will be of use to businesses and for local projects being carried out by AGENI.

[Box Insert]

Tecnopolis

The Tecnopolis project is backed by the Ministry for Special Projects in Southern Italy, in which the Tecnopolis CSATA [Center for High Technology Studies and Applications] consortium acts as a catalyst for various member organizations. Their varied, but interrelated contributions, come together in a common and synergistic whole: the scientific, industrial, and financial structures. The success of this first Italian science park which was launched in 1984, has led to a further phase of expansion and experimentation (1990-1992). Its goals are the innovative development of the local economy and the creation of modern infrastructures for technological research, the diffusion of innovation, and the training of human resources.

The Tecnopolis Program is being conducted on the basis of agreement with the Agency for the Promotion and Development of Southern Italy.

It consists in:

- the development of industrial and technological research projects for new products and services able to compete in the single European market;
- the dissemination and demonstration of new information technologies among local businesses;
- the creation and development of new high technology industries;
- the establishment of a network that can provide high technology services for the local economy and promote the establishment of new manufacturing industries at Tecnopolis and in southern Italy;
- training opportunities for executives, courses for researchers, and the creation of new professional positions. Over 500 researchers, technicians, university professors, and others employed in company programs and other facilities work at Tecnopolis.

The Bicocca Project

In 1985, Pirelli, the Lombardy Regional Authority, and the Milan Provincial and Municipal Authorities, signed a protocol of understanding to transform the Pirelli Bicocca area into a "Multifunctional Technology Center." This area, which covers a total of 714,035 square meters, is situated in the northern part of Milan, and until the mid-1970s was the home of industries that produced tires, electric cables, and other rubber products, including their offices and laboratories.

With the understanding, Pirelli established the first section known as Albania on the outskirts of the area. This section has already been completed and houses Philips, the IBM education division, Digital, Rusconi Publishers, Schiapparelli, the Italian Cotton Association, as well as Reuters, Silverstar, Lasi, Confartigianato [General Confederation of Italian Artisans and Craftsmen], Commodore, Italfarmaco, AEM [Milan Power Company], Sidi, as well as a whole series of services.

The primary objectives of the Milan Bicocca Technology Center are:

- the development and management of synergies between research and development, high technology production, certification, and training;
- the development of support mechanisms for horizontal (from one production department to another), and vertical (from public research to high technology industries) transfer of new technologies;
- the promotion of joint-ventures among universities, public and private research bodies, and high technology industries;
- the launching and development of its role as a breeding ground or incubator for high technology industrial projects;
- the launching of permanent and postgraduate training courses, aimed at developing resources to suit the needs of high technology industries including small and medium-sized industries;

The areas where intervention is required have been identified and subdivided into seven problem-solving areas that include buildings, environment, energy, robotics and artificial intelligence, biotechnology, communications, and aerospace. These areas will be dealt with on three different levels: materials, equipment, and systems.

Public and/or private organizations working in sectors such as computer science, electronics, mechanics, and vacuum technology, will be present at the Milan Bicocca technology center.

[Box Insert]

Genoa Research

The Genoa Research consortium was established in 1986, to promote, coordinate, and carry out projects for high technology transfer. The consortium has therefore launched a series of activities in the field of innovation whose objectives are: the creation and promotion of the west Genoa science park; the development of applied research projects; the development of projects aimed at supporting new business activities.

Genoa Research is today able to offer the following services to companies and other organizations both inside and outside the science park:

- qualification testing, characteristics testing, experimentation, and certification of products (Material and Products Qualification Center);
- research, testing, and training in the sectors of digital, mechanical, and electronic design, and urban planning (CAD [computer-aided design] center);
- computer-aided mapping (Mapping Center), also to be found in this center is the Interdisciplinary Laboratory for Territorial Information Systems (LISIT) where territorial planning methods, techniques, and applications are developed;
- applications for new computer technology and hardware in areas such as education, tourist information, company image, maintenance, diagnostics, and multimedial storage;
- integrated systems and circuits design, activities linking circuit manufacturers and users, special training (VLSI [very large-scale integration] Center);
- studies relating to the behavior of a component or equipment, before the construction of the prototypes (Digital Simulation Center);
- studies relating to: energy engineering, as a result of which significant know-how has been developed including the design and construction of hybrid vehicles for urban transport (the Altrobus); environmental problems such as the treatment of industrial waste and the monitoring of air and water pollution caused by industries;
- services and consultancy for businesses on strategic planning, market analysis, and investment and funding opportunities. Studies into problems connected with new industrialization processes, with specific reference to the territorial, industrial, economic, social, and financial

aspects. A newsletter dedicated to technological innovation, and an information service on telematic technologies and databases;

- conferences, seminars, and exhibitions at Badia di S. Andrea [St. Andrew's Abbey]—headquarters of the Genoa Research consortium—on topics of cultural and scientific importance, with the participation of national and international experts and personalities (Badia [Abbey] Association).

The members of the Genoa Research consortium are:

CNR [National Research Council], IRI [Institute for the Reconstruction of Industry], the University of Genoa, the Chamber of Commerce, the National Institute of Nuclear Physics, the Ansaldo company, Cetena, Elmag Bailey, Ilva, Rinaldo Piaggio Aeronautical and Mechanical Industries, Italimpianti, and Marconi S.p.A. [Inc.]

German Mathematics and Data Processing Society Plans Restructuring

92MI0627 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
19 Jun 92 pp 3-4

[Text] "Small is beautiful" has been the motto of the [GMD] German Society for Mathematics and Data Processing for the past six months. According to Federal Research Minister Heinz Riesenhuber and GMD board chairman Prof. Dennis Tsichritzis, who recently addressed a scientific press conference in Bonn, the increasingly rapid pace of technological innovation requires even closer cooperation between the state, scientists, and researchers and more rational use of available resources.

The GMD long ago anticipated that increasing dynamics would accompany a slowdown in funding, leading it six months ago to adopt the aim of "small is beautiful." It is now close to achieving this strategy, which it hopes will lead to new opportunities in the international IT research market.

In addition to cutting back on content, the GMD has made structural changes and adopted new management structures of:

- Concentrating work at its Bonn, Darmstadt and Berlin sites and closing its Berkeley and Washington branches; transferring the Berlin-based FIRST (Institute for Computer and Software Technology) and FOKUS (Institute for Open Communication Systems) Institutes to Adlershof in east Berlin;
- Strengthening the dynamics and autonomy of individual institutes by introducing market-led mechanisms into project and personnel procurement;
- Enhancing employees' motivation and mobility by

introducing mechanisms to facilitate movement between areas of work;

- Strengthening cooperation between institutes, leading to improved overall quality of research through integrative programs spanning different institutes.

Large-scale research is faced by conflicting needs: it has to satisfy the rapidly-changing requirements of universities and industry, while also ensuring longterm continuity and balance in basic research, if it is to be a proper partner to university- and industry-based research.

Concentration on the requirements of specific applications makes it possible to assess the value of research. To this end, the GMD has initiated a program of measures with new aims of:

- Concentrating R&D on four priority areas: cooperation and telecommunications, parallel processing, intelligent multimedia systems, design processes; previous areas not compatible with the above are to be discontinued, with those involved transferred;
- Integrating research capacities in each priority area into projects spanning different institutes and including industrial partners, through integrative projects; additionally launching pilot projects demonstrating currently exemplary results of research;
- Restructuring general, basically-oriented IT research so as to give greater emphasis to the requirements of specific interdisciplinary applications: for example, the bioinformation systems developments led by Prof. Thomas Lenghauer;
- Significant strengthening of the GMD's European and international role as a research center, shown by the high proportion of EC projects in the GMD's budget, the GMD's central role in ERCIM [European Research Consortium for Informatics and Mathematics], and the GMD's involvement in international research programs based in the U.S., e.g., at the International Computer Science Institute (ICSI) in Berkeley, and in Japan, such as the GMD's Tokyo office and its involvement in the Real World Computing Program (RWC);
- Strengthening and developing the Bonn scientific region: major components of this include initiatives to create a technological faculty at Bonn University, setting up a service center for parallel computing at Sankt Augustin, in collaboration with the DLR [German Aerospace Research Agency e.V.], and the innovation-oriented R&D program POLIKOM, a GMD integrative project.

Preparations for the POLIKOM integrative project are at an advanced stage. POLIKOM's purpose is to support collaboration between geographically separated organizations or firms, such as regional administrations.

An early example of POLIKOM is the Bonn-Berlin Information Association: decentralized decision-making centers in Europe will be another area to be addressed.

German Government Plans Bonn Scientific Region
92MI0628 Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
 19 Jun 92 p 5

[Text] A major component in the federal government's recently-approved plan for compensatory measures to favor the Bonn region is that of giving the area new functions relating to R&D funded by the BMFT [Federal Ministry of Research and Technology]: the aim of the plan, Bonn Scientific Region, devised by the Federal Ministry of Education and Science (BMBW) largely in conjunction with the relevant ministries of the states of Nordrhein-Westfalen and Rheinland-Pfalz, is to build on the region's existing potential so as to enhance the profile and attractiveness of the region in a convincing and longterm manner.

The cabinet adopted the proposal by the Federal Minister for Research and Technology to give priority to developing high technology research institutions.

This should then provide an incentive for technologically oriented firms to establish themselves in the region, thus enhancing its innovative strengths. A further positive effect will be to increase European scientific exchanges by improving the infrastructure for international contacts.

The major components in the federal government's plan are:

- Developing a technological faculty at Bonn University, to include departments of biotechnology, neural information systems, neural biology, environmental technology and materials research, or an Institute for High Technology (including the creation of a mathematical research center and the development of a German supercomputer);
- Setting up CAESSAR: a Center for Advanced European Studies and Research, perhaps in the Blonik area;
- Setting up a foundation, the Bonn European School of Economics e.V. (BSE), as an autonomous institution conducting postgraduate studies and research into economics, law, and administration, concentrating particularly on Central and Eastern Europe;
- Setting up a Rhein-Sieg Technological University for Nordrhein-Westfalen, together with a department of the Rheinland-Pfalz Technological University to be based at Bad Neuenahr/Ahrweiler. Setting up an Institute for European Integration Research and a German Agency for Education and Science in Europe;
- Creating a European Institute for Regional Planning;
- Establishing new institutes of the Fraunhofer Society and the Max Planck Society;
- Setting up an agency for assisting gifted students through vocational training and education;
- Establishing a German-American Academy of Sciences and a Bonn Scientific College;
- Expanding the Bonn Scientific Center;

- Extending the infrastructure for exchanges and contacts between scientists and students.

The possibility is also being examined of establishing a scientific park, to use scientific and technical information to present technical developments to lay persons in a clear and comprehensible manner.

A similar plan includes the provision of an Academy for European Studies of Technology Assessment.

A study has been commissioned to examine this project in further detail. The possibility of establishing an Institute for Synchrotron Radiation in Bonn is also being examined.

German Research Association Establishes Programs in New Laender

92MI0630 Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
 19 Jun 92 p 11

[Text] On 1 July 1992, the German Research Association (DFG) will establish two new research programs in the fields of engineering and computer science at German Technical colleges. The Technical University of Dresden is the first university of the new laender to be involved.

The new special research program on "Automated Systems Design, Synthesis, Testing, Verification, Specific Applications," to be introduced at the University of Dresden will involve leading-edge electrotechnical engineering and computer technologies. Scientists from the universities of Dresden, Ilmenau, Karlsruhe, and Paderborn will work together to develop models, methods, algorithms, and technologies for automated systems design. In this field cooperation between the basic and applied research sector and between industrial development and production is crucial to the competitiveness of the electronics industry in Germany and Europe. Cooperation among universities in the old and new laender will ensure the increasing participation of Dresden scientists in international scientific developments. Yet this unique system involving the establishment of special research programs in various technical colleges will be of limited duration. After two trial periods, the universities of Paderborn and Karlsruhe will abandon this research initiative.

At the University of Erlangen-Nuernberg engineers and materials scientists will carry out research into "production systems for electronics." Their research work will focus on the processes, machinery, and strategies used to incorporate various components into an electronic circuit. As a result of the growing miniaturization of electronic components, the surface properties of the materials used have become increasingly important. By conducting regular tests on these materials, the optimization of manufacturing processes should be guaranteed.

Another project area concerns the development of new equipment and basic process tests to ensure a more rapid

application of new technologies such as UV hardening of casting resins, microprocessing using lasers, and three-dimensional assembly with robots. Another objective is the technical and organizational optimization of quality assurance to reduce error rates. Tests will be carried out in cooperation with electronics industries.

France: Research Minister Identifies Priorities

92WS0672A Paris AFP SCIENCES in French
11 Jun 92 pp 1-2

[Article entitled: "Basic Research: France Does More than the United States and Japan"]

[Text] Paris—Research and space minister Hubert Curien stressed at the 10 June cabinet meeting that France was investing more in basic public research than the United States and Japan. He also defined the priorities for the future.

According to the minister, total expenditures for research and development jumped from 1.98 percent of France's gross domestic product (GDP) in 1981 to 2.4 percent today. That translates into 173 billion French francs [Fr] for 1992. Basic public research accounts for 18 percent of the sum, says Mr. Curien, or over Fr30 billion this year. France is thus spending 0.4 percent of its GDP on basic research, compared to 0.3 percent in the United States, and 0.2 percent in Japan.

Mr. Curien identified several priorities for the future, including pursuing the policy of recruiting researchers; making it easier for them to move between research organizations and higher education; maintaining the balance between light and heavy research (AIDS, astronomy, oceanography); and changing the nature of research organizations, notably by encouraging them to work more closely with universities.

The "Curien accords" of 1989, for example, upgraded the status of researchers and ITAs (engineers, technical personnel, administration) by opening up career paths. It also began making those professions more attractive through financial incentives.

Of a total of 120,000 researchers counted in 1989, 41,000 were working on basic civilian research—about 15,000 in public research organizations and 25,000 in higher education.

The number of research grants has more than doubled, jumping from 1,850 before 1981 to 4,480 in 1991. The minister also intends to intensify efforts to use the results of basic research to strengthen the economy.

Summing up the results of the government's research policy, Mr. Curien stressed that reprints of French papers abroad rose 30 percent over the last five years. Foreigners now submit 38 percent of the doctoral theses in France, "an indication that the world recognizes the quality of our laboratories."

Moreover, Mr. Curien pointed out, the ministry created the Science and Technical Observatory in March 1990; the Observatory published its first report "Science and Technology Indicators—1992" last October.

The report details the most important characteristics of our research using graphs and tables, and places it in a European and international context. The only other publication of the same kind in the world is SCIENCE AND TECHNOLOGY INDICATORS, which the National Science Foundation publishes in the United States, but which naturally deals chiefly with American science.

Boxed Material: A Passage From the Cabinet Meeting Communique, Summarizing Mr. Curien's Report

"The minister of research and space reported on basic research."

"The priority given research boosted the share of the gross domestic product spent on it from 2 to 2.4 percent between 1980 and 1992. This increase benefited basic research. It received about 18 percent of total research allocations. Our country is thus one of the strongest supporters of basic research."

"The renown of French science has grown over the last few years, as shown by the greater number of international prizes awarded to French researchers and the more frequent citation of their scientific publications."

"An effort to anticipate future developments and evaluate options, which gave rise to the National Research Assessment Committee in May, 1989 and to the Science and Technical Observatory in March, 1990, helped bring about this change. The following guidelines have been adopted:

"A regular flow of new researchers will continue to be recruited, in particular to offset the many retirements expected at the end of the decade. Researchers will be encouraged to move between research organizations and higher education."

"The balance between resources allocated to fields which require heavy equipment and those which do not will remain the same. Moreover, the creation in 1988 of the Council for Large-Scale Scientific Equipment has made it possible to schedule the use of such equipment satisfactorily. A study for the same purpose will be made on policy for large research programs."

"Big research organizations must become more involved in the development of university research and in education through research. Progress along these lines will be pursued. For the National Center for Scientific Research, this means continuing efforts to decentralize and to expand interdisciplinary research and international relations."

"The findings of research laboratories must be put to better use to benefit our economy. A technology brokerage company is being formed among several research

organizations, including the National Center for Scientific Research and the National Agency for the Upgrading of Research."

"A taste for science must be developed among our fellow citizens. The centers for scientific, technical, and industrial culture, which have no equivalents in Europe, are working to accomplish that goal among the general public. A national event called "Celebration of Science" will be held between 12 and 14 June to teach the public more about the state of research in France. A thousand science exhibits or events will be put on. This event will be held every year."

EC Official Assesses European Aeronautics Industry

92WS0678C Brussels EUROPEAN AVIANEWS INTERNATIONAL in English Jun 92 p 20

[Article by Patrick Anspach: "EC Defends Aeronautics"]

[Text] The European Commission has pledged to defend the competitiveness of Europe's aeronautics industry, which realised a turnover of ECU37 billion in 1990 and directly employs some 450,000 people (over 1 million indirectly), by encouraging better workforce training and by increasing investments in research and development.

According to Martin Bangemann, commissioner in charge of industry, Europe's aeronautics industry is not in a state of crisis; this sector experienced a constant annual growth of 5 percent during the eighties. However, it must now be supported within the framework of the new industrial strategy concept envisaged by the EC in advance of 1993's Single Market.

In this respect, the Commission has set up a working group whose task (for a date that has yet to be specified) it is to draw up proposals regarding an insurance system against the fluctuations of the U.S. dollar, which can handicap the aeronautical industry's competitiveness. However, the development of such a mechanism is still proving difficult—from a technical viewpoint. This concerns in particular the observance of GATT rules, and the Commission still hasn't made any precise proposal on this. Martin Bangemann has made it clear that the Commission has no intention of subsidising any "compensation fund," which would have to be self-financed by the industry itself.

As in the automobile sector, Bangemann has confirmed that Europe's aeronautical industry is to be supported by a "non-interventionist" policy by the European Commission. "The measures that need to be taken are firstly

at the initiative of and the responsibility of the manufacturers. However, the Commission can provide them with a favourable environment for such measures," says the Commission.

Besides the initiative on the dollar rate fluctuations, Bangemann proposes acting on several levels:

- technical standards (accelerating the standardisation process);
- the legal framework (setting up a European company statute);
- professional training (emphasis on upgrading and conversion) and harmonisation of qualifications;
- competition within and outside the Community (regulations will be applied while taking into account the "particular" situation of the aeronautics industry);
- cooperation, especially with industry in eastern countries (to avoid new competition).

Avoiding Duplication

European industry should also learn to improve cooperation with regard to research and development (R&D), where Europeans act in an uncoordinated manner in the face of stiff competition from the Americans. Duplication levels in Europe may be as high as 20 percent to 30 percent.

While Bangemann recommends that research in the aeronautics industry should benefit from higher appropriations for the Fourth Community research programme (the period between 1993 and 1997), he has formally denied rumours that the Commission was prepared to devote ECU700 million to this sector: "discussions on the Delors II package are still not sufficiently advanced for us to be able to quote any figures at this stage."

Although prospects for Europe's aeronautics industry (50 percent of activities are by aircraft manufacturers) remain strong, hopes are no longer unrealistically high. After the boom years at the end of the eighties, when back orders for aircraft of over 130-seats stood at 3,000 units, there was a sharp fall in sales.

The slowdown in the economic expansion of the United States and Europe, together with the effects of the Gulf War, has led to a fall in deliveries from 600 aircraft per year (between 1991 and 1993) to 400 for the coming years. Nevertheless, the situation in the regional aircraft (20 to 130 seats) sector is still hopeful; annual deliveries for this kind of aircraft increased from 200 in 1984 to over 400 in 1990. Growth in this sector should also continue until the year 2010, with sales of between 5,000 and 7,000 units. European industry contributes around half of worldwide deliveries of regional aircraft and dominates the turboprop aircraft sector.

EC's R&D Policy Criticized

92WS0678Z London INTERNATIONAL
MANAGEMENT in English Jun 92 p 20

[Text] A battle royal is in the making over the Community's ECU2.4 billion research budget. Although EC research commissioner Filippo Pandolfi recently won approval from fellow commissioners for a White Paper outlining new research spending priorities, strong opposition to his policy prescriptions exists among member states.

Few dispute that Community research money could be better spent. Poorly defined priorities, funds scattered over too many projects and ineffective communication of results mean that European industry makes little use of research for which the Community pays heavily.

To tackle these problems, Pandolfi proposes speeding up administrative procedures and concentrating on a smaller number of high-priority technologies. He is also seeking a budget increase to ECU4.2 billion by 1997.

But most importantly, Pandolfi's strategy offers the first outline of how the Commission will implement the vaguely-defined industrial policy objectives agreed last December at the Maastricht summit. There, European leaders backed Commission plans to place improved industrial competitiveness at the heart of research policy.

Pandolfi suggests a shift from basic research towards projects closer to the market. Strict rules now allow Brussels to support only "pre-competitive" research. Pandolfi wants more resources devoted to "key technologies on which Europe's industrial system depends." Suggestions include microelectronics, flat screens, environment-friendly technology and futuristic aircraft cockpits. Although Commission officials are at great pains to argue that they are not proposing sectoral aid, Brussels insiders say the policy is clearly targeted towards the motor, aerospace and electronics industries.

The Commission's plans sent alarms flashing all over Brussels. Reaction was strongest in the UK and Germany; both argued unequivocally against promoting specific industries. That signals a bare-knuckle fight if the Commission tries to use research policy as a back door for aid to struggling EC industries.

Banks Told to Shape Up

Moving money around the Community is slow and expensive. Whether it is a Belgian company trying to pay for parts ordered in Germany, or a Frenchman trying to order books from an English speciality publisher, cross-border payments can take weeks—and on average cost 20 times more than similar transactions domestically.

Help may be on its way. Sir Leon Brittan, the EC commissioner for financial services, recently suggested measures aimed at speeding up cross-border transfers.

But because the Commission believes problems stem more from poor networks and bureaucracy than from deliberate overcharging, its officials have little legal power to impose solutions. "We can't order people to speed up transactions," says a member of Brittan's staff.

Instead, the Commission has given heavy backing to voluntary efforts underway in the banks to improve services. Brussels is spearheading negotiations to create unified standards to speed automatic payments and is supporting bank plans to develop EC-wide electronic networks. The Commission also proposed setting a minimum threshold below which national reporting requirements on fund transfers would end. That would cut administrative delays, particularly in southern Europe. Eventually, Brussels also wants links created between the national inter-bank clearing systems now in place Community-wide, but the banks are resisting because of the investment required.

To pacify consumers, Brittan also offered up a "users' charter." Customers are now supposed to be told how much a transaction costs and how long it will take. Nevertheless, the charter has been heavily criticized by consumer groups, who argue that it offers no legal recourse. Officials say that if banks do not shape up, stronger legislation will follow.

Distance Sellers' Last Chance

After almost a year of consultations, Brussels has unveiled its controversial directive to harmonize Community rules governing "distance selling," such as mail order. The highly-restrictive original proposal has been greatly watered-down.

The directive is designed to guarantee consumers' basic rights when they shop by correspondence. It covers traditional catalogue and direct mail sales as well as modern variants using fax machines, computers and teleshopping. A seven-day cooling off period will be mandatory for most products sold by correspondence through the Community. Consumers will also have the right to receive information speedily on the terms of the sale and on the supplier. Unsolicited deliveries requiring payments will also be forbidden.

However, requirements that sales information be printed in the language of the consumer have been softened, as have suggestions that TV and radio advertisements should contain lengthy consumer information. Hints of a mandatory Community insurance fund to protect against fraud have also vanished.

But the biggest change comes in how the measures will be enforced. Rather than imposing heavy-handed administrative procedures the Commission accepted industry arguments that voluntary codes of conduct run by the advertising and direct mail industries in each country would prove more effective. Commission officials admit this shift toward self-regulation is a test case for future policy.

Large-Scale R&D Hardest Hit by Spending Cuts

Riesenhuber Demands One-Third Self-Financing

92WS0679A Duesseldorf VDI NACHRICHTEN
in German 12 Jun 92 p 6

[Article by moc: "Sign Contracts or Close the Institutes;" initial paragraph is VDI-N introduction]

[Text] The need to save is hitting the major research institutions in the old laender hard. Among the big losers are nuclear technology facilities and the Society for Mathematics and Data Processing [GMD].

Something that has been discussed for years but never implemented is made possible by the politics of scarce funds: The 13 major research institutions in the old laender will have to shed weight. They are to become "slimmer as well as more muscular," according to Federal Research Minister Heinz Riesenhuber last week in Bonn.

Particularly hard hit are large research institutions that work in applied research fields, for example the GKSS [Society for Nuclear Energy Utilization in Shipbuilding and Shipping], which "for years has not found any industrial users" (Riesenhuber) for their underwater technology. The federal research minister took these major research facilities to task with uncharacteristic severity: "Sign contracts or close the institutes." According to Riesenhuber the only solution for these institutes is with third-party funding if they want to survive: "Qualified research must expose itself to this competition," it says in a report by the BMFT [Federal Ministry of Research and Technology] at the beginning of this month on the situation in major research.

The same also applies to major research facilities such as the GMD, the KfA [Nuclear Research Facility, Juelich] and the KfK [Nuclear Research Center Karlsruhe], which will have around or in excess of 15 percent of their basic funding positions cut by 1994.

For 1992 the major research institutions in the old laender receive 2.3 billion German marks [DM] from the BMFT's budget, not quite 24 percent of the entire BMFT budget and two-thirds of the BMFT's institutional support. The 13 major installations in the old laender employ nearly 22,000 people, approximately 15,600 of whom have permanently funded positions.

As early as last year Riesenhuber announced that BMFT financing for major research institutions would not grow until 1994, which is the equivalent of a clear cutback in funding. By 1994 Riesenhuber wants to cut up to 1,900 permanent positions, above all in those fields where the employees "can no longer be transferred." Here as well Riesenhuber is likely to have primarily the nuclear technology facilities (KfK and KfA) in mind. Approximately 1,200 of these 1,900 employees are to leave by means of a pre-retirement regulation. The Federal Research Ministry will pay DM60 million, and the Federal Labor Agency the same amount.

The SPD [Social Democratic Party] opposition may hardly regard Riesenhuber's need to act quickly as more than an "expression of helpless maneuvering in the financial crisis" and a "horse cure without strategic perspectives," according to the chairman of the Research Committee of the German Bundestag, Wolf-Michael Catenhusen. The SPD opposition complains about the lack of a thorough evaluation of German major research which ought to end in a "Major Structural Research Concept 2000."

Riesenhuber also admits that he would have preferred a scientific evaluation of the major research institutions to cold reform based on fiscal viewpoints. But according to a statement by the Scientific Council such an evaluation would have taken until the end of the millennium, "and we had to act now" (Riesenhuber). Even so, the research minister is convinced that at the end of this process "the major research institutions will be in better shape than before."

Winners and Losers Profiled

92WS0679B Duesseldorf VDI NACHRICHTEN
in German 12 Jun p 6

[Article by Peter Frey: "Door to Door in the Service of Science;" initial paragraph is VDI-N introduction]

[Text] The 13 major western German research institutions must slim down considerably. The budget fund freeze, imposed as early as a year ago by the BMFT, at the 1991 level will in principle continue to apply, but the budget cuts will be more differentiated than initially planned. Up to 1,900 jobs could fall victim to this financial diet.

AWI: The Alfred Wegener Institute for Polar and Ocean Research in Bremerhaven is among the four major research installations with the smallest cuts. For this reason there will be no reduction of personnel. Even so, the AWI scientists must accept that the funding for already approved positions for Arctic research will clearly be delayed. During this year and the coming year, the institute's polar aircraft will spend more time on the ground than planned. Investments for research equipment will in part have to be postponed until the following years. There is joy in Bremerhaven that it will be possible to continue the Antarctic program of the former GDR with the establishment of a branch office in Potsdam. AWI's spectrum will thus be expanded "by terrestrial research for the study of global changes."

DESY: It is of vital importance to the German Electron-Synchrotron foundation in Hamburg that it will be possible for the scientists, presently numbering 800, from 16 nations to use the scientific potential of the Hera storage ring facility, which began operating last week. To be sure, DESY is not forced to reduce personnel, according to press spokeswoman Petra Harms, but no new positions were provided for either. The BMFT's diet regimen means that capital funds for maintaining assets, maintenance and infrastructure will have to be limited to the absolutely necessary.

DKFZ: The famous cancer research institute is concentrating on temporary labor contracts. Half of the present 1,460 employees work and do research with soft money. Despite the cutbacks it was therefore possible to expand applied tumor virology and largely to realize planned cooperations in the clinical field. Only the budget for 1994 causes the spokesman for the business-administrative committees, Dr. Reinhard Grunwald, even more headaches than he would like: "There we still have a gap in medium-term financial planning, which we will have to continue to discuss."

DLR: The urgent appeal by the German Aerospace Research Institute to the politicians who apply the cuts in a differentiated manner was not sufficiently heard, according to the way the DLR sees it. Add to this that the Federal Ministry for Defense is also freezing its funding. The result: A cut of about 450 positions appears unavoidable in the coming years. A figure which is clearly higher than personnel fluctuations. Only if the pre-retirement clause instituted by the BMFT is sufficiently used will it be possible to make do without layoffs. A drastic impact on the performance range is inevitable: Deep cuts in programs, projects and facility operation are accompanied by the elimination of the fields of deep-submergence technology and tribology.

GBF: The personnel at the Society for Biotechnology Research in Braunschweig has already been cut by 8 percent since 1990. The administrative manager of GBF, Dr. Helmut Zeitraeger, therefore thinks that in the future it will essentially get by without additional personnel cuts. But a considerable increase in positions for future scientists has been helped by the Special Program for Higher Education Institutions (HSP II).

GKSS: "Restructuring" is the motto for the GKSS Research Center in Geesthacht. The field of Environmental Research/Climate Research is being expanded, primarily as a result of taking over a working group in Magdeburg and the connected founding of a new institute. Environmental Technology field was spun off. As a research concentration of its own called Non-Polluting Separation and Process Technology, the GKSS people work there together with scientists from a department of the former Institute for Polymer Chemistry in Teltow, which was also taken over by the GKSS. The work on reactor safety research will end with the current year. The Underwater Technology field will be cancelled no later than 1994.

GMD: The current program budget for the Society for Mathematics and Data Processing provides for a 9 percent personnel reduction (about 100 personnel years) between 1992 and 1995. In the R&D field 3 percent, in the R&D support field 11 percent and in the administrative area 14 percent of the jobs will be eliminated. The most important structural changes are: A geographical concentration to the locations in Bonn, Darmstadt and Berlin and closing the branches in Berkeley and Washington. The First and Fokus institutes in Berlin will move to the eastern part of the city. The 14 institutes and

research offices to date will shrink to eight. The GMD will further concentrate on market-oriented mechanisms in project and personnel acquisition as well as on stronger cooperation between the institutes.

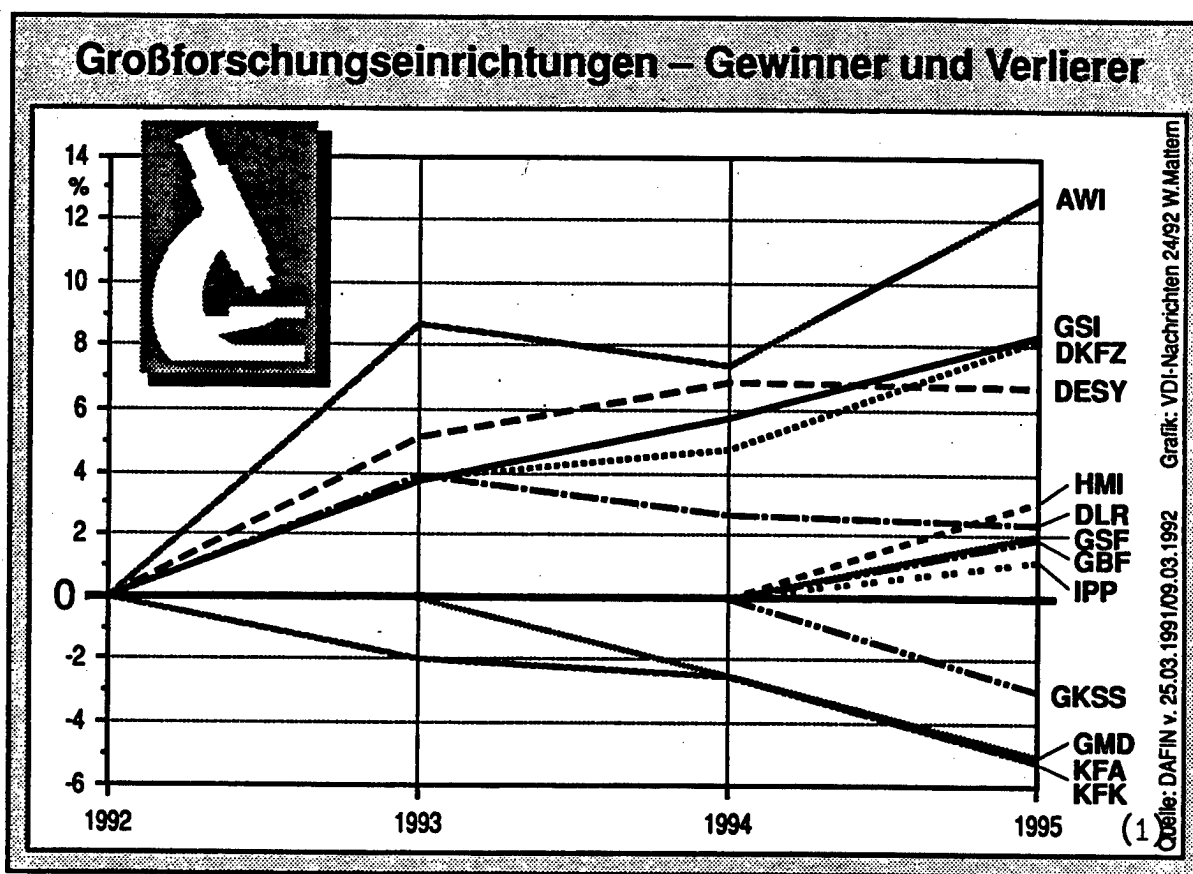
GFS: The GFS [Joint Research Institute for the European Organizations] Research Center for Environment and Health has already been eliminating one-third of all its institutes since the early 1980s. At the same time six new facilities were founded between 1986 and 1991. The reorientation did not save the center in Neuherberg near Munich from budget cuts by the BMFT, however. If the GFS is to get by without cutting jobs, the acquisition of third-party funding must be accelerated. Even today 600 employees (about 30 percent) are being paid out of this funding pocket. The scientists increasingly view the GSF management as endangering the continuity of the research. "The savings program is hitting us brutally," according to a spokesman from Neuherberg; "we cannot conduct dioxin analysis today, worry about ozone tomorrow and conduct forest damage research the day after tomorrow, just because it happens to be fashionable."

GSI: The Society for Heavy Ion Research in Darmstadt has been a service facility for German higher education and international institutes for years. The business manager, Hans Otto Schuff, is happy that the GSI is part of the small circle of privileged major research institutions. The 5,000 accelerator-beam operating hours necessary for meaningful operation can be maintained for the time being. This assures that more than 1,000 external visitors will be able to continue to work on science. Although things are tight in the personnel area, according to Schuff, for the moment it is possible to avoid job cuts.

HMI: Despite necessary savings in all areas, the Hahn-Meitner Institute in Berlin will be able to avoid cutting jobs in the future. The takeover of 30 employees from the former Academy of Sciences (AdW) did not place a burden on HMI's budget. Since the research reactor at the Laue-Langevin Institute (ILL) in Grenoble, France is not available, the throng of international scientists who want to use the Berlin neutron source BER II is growing. The BMFT has now reacted to this development with an additional DM2 million in budget funding for the current year.

IPP: The Max-Planck Institute for Plasma Physics reacted with irony to Riesenhuber's diet regimen: "The allocations made available for 1993 deviate to such an extent from the funds applied for, that in the IPP's opinion they can only be the result of an error." The fusion researchers in Garching consider themselves incapable of filling the income gap with savings measures and fear a "difficult crisis of existence." If the diet persists, it will not be possible to expand currently running major experiments and prepare for new experiments. The IPP risks losing its leading position worldwide in the field of fusion research.

KFA: In addition to the KfK and the GMD, the Juelich Research Center with its 4,000 employees is among the big losers in Bonn's funding cuts. A reduction in the number of employees therefore appears inevitable. But Joachim Treusch, chairman of the board of KFA, is concentrating on a socially acceptable attrition of jobs in



Major Research Institutions—Winners and Losers

"Slimmer and more muscular," according to Federal Research Minister Riesenhuber, is what the major research institutions in western Germany are to become. But freezing budget funds at the 1991 level (zero line) applies only to the DM2.3-billion general budget of all 13 institutes. The winner of the differentiated diet is the Alfred-Wegener Institute, among the losers is GMD, KFA and KfK.

Key: 1. Source: DAFIN 23 March 1991-9 March 1992; Graphic: VDI-NACHRICHTEN 24/92 W. Maattem

order to survive the hard financial times. "We still assume that no one will be let go." Much is riding on whether additional third-party funding can be obtained. At this time the share of non-government support at Juelich is 14 to 16 percent of the DM500 million budget and is thus about twice as high as the average for all major research institutions. Cutbacks in individual fields (such as in materials research), as well as more cooperation with other major research institutions, round off the savings measures at the Juelich center.

KfK: The executive board of the Nuclear Research Center in Karlsruhe would like to "preserve the personnel budget as much as possible." In order to achieve this ambitious goal, the share of third-party funding to cover the R&D program is to grow. Layoffs are still out of the question at Karlsruhe. The BMFT's cutbacks, as well as Bonn's model calculations for a reduction of permanent jobs, are considered wrong by the KfK, because they do not take into account the changes

resulting from the new program structure with the three supporting fields of Environment, Energy and Microsystem Technology.

EC: Efforts To Patent Biotechnology Products Deadlocked

92WS0710A Paris INDUSTRIES ET TECHNIQUES
in French 19 Jun 92 pp 32-34

[Article by Valerie Borde: "The Trials and Tribulations of Patents"; first paragraph is INDUSTRIES ET TECHNIQUES introduction]

[Text] Plants and animals may soon be patentable in Europe, but for now manufacturers, environmental activists, and environmental protection associations are blocking the directive under discussion.

In 1980, the United States Supreme Court ruled that Diamond V. Chakrabarty, a General Electric researcher,

could file a patent to protect a bacteria that had been genetically altered to break down hydrocarbons. It was the world's first patent on a living organism. At the time the Supreme Court noted that there was no reason to make a special case of living organisms, and declared that anything that could be created by human beings was patentable. In 1985, this position was extended to plant life, and in July, 1988 to animals. Finally, in 1991, the National Institute of Health (NIH) filed a patent application for human gene sequences [discovered] as part of the Human Genome Project. What is next?

The rapidity of the decisions made in North America pushed Europe to react in turn. Today, a draft directive on the patentability of living organisms is being discussed in Parliament, in Strasbourg. And those concerned—manufacturers, farmers, and environmental protection associations—are reacting to it violently. The directive also raises serious ethical questions that require urgent response.

Current European legislation on the patentability of living organisms is already full of paradoxes. In 1978 the Munich Convention, which outlines the operation of the European Patent Office (EPO) and regulates intellectual property, stipulated that plant varieties and animal races could not be patented. The paradox lies in the definition of variety and race. There is no precise definition for the latter. Outlawing the patenting of something that does not exist legislatively is not much of a guarantee! Moreover, last October a patent was filed and granted on the now famous Harvard mouse, whose genetic inheritance was altered (a cancer-causing gene was added to it, to study anti-cancer medications). The Harvard mouse was, in fact, not deemed an animal race.

As for varieties, they have been defined since 1961 by the Union for the Protection of Plant Varieties (UPOV), which grants their discoverers a certificate of plant obtention (Cov) that is subject to highly specific conditions. There are two essential differences between the Cov and patent systems. A Cov protects a variety for 20 to 25 years, and grants its holder the exclusive right to produce for commercial purposes or sell the variety. But nothing prevents anyone from using the protected variety to create and subsequently market other varieties; for R&D purposes the variety, although protected, remains accessible to all.

It did not take manufacturers long to find a way to circumvent this system. Indeed, a gene—which, defined as strictly as possible, is never anything but a molecule—can be patented. Likewise, a process for selecting a new variety is patentable as soon as it involves an artificial step. Manufacturers have consequently patented processes for fabricating (or more accurately, genetically transforming) plants. Rhone-Poulenc Agrochimie, for instance, has patented the production of tobacco that has been genetically engineered to resist a specific herbicide. But the EPO has applied the rule that extends protection of a process to its product to Rhone-Poulenc's tobacco. And that does the trick: The plant as such has not been

patented, but is in fact protected. Nonetheless, the system is even more ingenious than manufacturers. For once the characteristics of a plant are stabilized, it becomes a plant variety and is covered by the plant obtention system. Anyone can use it for research purposes. This amounts to filing a patent that becomes obsolete once the product is marketed! It is easy to understand why discoverers are disgruntled.

In short, it was high time to do some housecleaning of Europe's patent protection laws. The directive being discussed will stipulate what can and cannot be patented, and under what conditions, and will clarify the relationship between UPOV and the EPO. Brussels has been the site of violent clashes between the different lobbies concerned since 1988. On one side are the powerful chemical companies, which are used to the patent system and determined to do away with Coves. On the other side are seed producers, which are generally smaller companies without benefit of an armada of lawyers, and which have been operating under the Cov system for 30 years.

The top priority of the chemical industry lobby has been to attack farm seeds, otherwise known as "the farmer's privilege." The latter authorizes farmers not to pay new royalties to Cov holders for each new generation of self-reproducing plants such as wheat. Indeed, each year farmers set aside a portion of what they produce for replanting the following year. Chemical manufacturers would like to eliminate that UPOV clause and establish a sort of reuse tax. In March, 1991, the UPOV Convention was revised. Cov protection can now be extended to all plant species and genres, rather than just varieties. Varieties derived from a protected variety can no longer be marketed without the consent of the protected variety's owner. The notion of dependence still needs to be precisely defined. But chemical makers were unsuccessful in bringing UPOV around on the "farmer's privilege" issue. Today farm seeds are governed by a law similar to the one that protects video cassettes: The buyer has the right to reproduce them for his own use, but cannot give them or sell them to anyone else. For now, the pending patent directive does not plan to abolish the farmer's privilege. Creators of new seeds are losing hope, and accuse Brussels of trying to kill plant biotechnology research.

"In France, it is estimated that farm seeds deprive plant discoverers of nearly 50 percent of their royalties. The figure jumps to 85 percent in Spain, where self-reproduction is traditionally more common," explains Francois Chretien, the head of the patents department at Rhone-Poulenc Agrochimie. "In the United States, where the farmer's privilege has been entrenched for decades, there are no more research programs underway on self-reproducing species such as husk grains (wheat, barley, oats, rye), rice, soya, and rapeseed, and also none involving fruit trees, roses, or carnations. As a result, wheat yields have not increased in 30 years," adds Roland Petit-Pigeard. Mr. Pigeard is the director of the Plant Licensing Management Bank (CGLV), which controls the working of plant patents in France. (It is

actually the plant equivalent of SACEM.) Indeed, plant biotechnology research is expensive—very expensive. According to Gerard Nomine, the president of Organibio (the interindustry bioindustry association to which both chemical and seed makers belong), it takes about 10 years of research and \$100 million to bring a new plant to market. That compares to 220 million French francs [Fr] for a new medication. In France, the budget for research on self-reproducing plants is estimated at about Fr350 million to Fr380 million, against Fr250 million in income from the research. An expenditure of Fr450 million for research on corn, which is not self-reproducing, brings in about Fr560 million. Under the circumstances, it is understandable that these economics, combined with the uncertain future of the laws, are causing some manufacturers to pull out of research on self-reproducing seeds. "If the farmer's privilege is upheld, we will probably halt all biotechnological research into self-reproducing plant species such as wheat, peas, or soy beans," explains Bernard Le Buanec, the research director of the Limagrain group. "Those species account for 30 to 40 percent of our biotechnology research, which is budgeted for Fr35 million to Fr40 million. And we have 25 researchers working on self-reproducing varieties." The CGLV's Roland Petit-Pigeard points out that Orsan is getting out of large crops such as wheat, while Shell and Unilever are selling off their investments in plants. Conversely, Rhone-Poulenc Agrochimie, which is less involved in grains, is pursuing its research into tobacco, corn, soy beans, and sunflowers.

Animals are another story entirely. Transgenesis is just beginning, and only a few companies, such as Transgene in Strasbourg, are working in the field. There is no certificate of animal obtention, and no risk of farmer's privilege, since "cuttings" cannot be taken from animals. The selectors own the breeder animals, and no one can reproduce an animal without owning its progenitors. The same directive will apply to both animals and plants.

But manufacturers' rejection of the farmer's privilege is not the only reason European Parliament decisions are deadlocked. Many ethical decisions are still up in the air. The case of the Harvard mouse is illustrative. Since Harvard's transgenic mouse is considered an extremely important step in anti-cancer research, the members of parliament—who at first refused to patent it—finally changed their minds in October of 1991. They held that the use of the transgenic mouse was not unethical since it enables scientists to make strides in research against cancer. On the other hand, they just refused last May to authorize a patent on a transgenic mouse for cosmetic research. Can this type of decision be left in the hands of the European Patent Office, which does not necessarily have authority in matters of ethics?

Intellectual property laws state that, to be patentable, an invention must not contravene public order or morality. But those who defend the patentability of living organisms point out that the rule has not always been observed. "Have we never patented firearms?" Francois

Chretien of Rhone-Poulenc asks ironically. Is that any reason to repeat the mistake? Ethical questions must be raised, and the patentability of living organisms is a serious enough question to warrant informing the public before it is accepted.

The stakes involved in patenting living organisms are planetary in scale, and the directive is running up against violent opposition from environmentalists. Countries participating in the Rio Conference are in the process of signing the international treaty on biodiversity. "Two-thirds of the world's 50 million living species are found in the tropical rain forests," explains Pierre-Benoit Joly, who studies the economics and sociology of plant biotechnology R&D at the Grenoble National Agronomic Research Institute (INRA). "But a million of them will be irretrievably lost by the year 2050 if nothing is done." He points out that the objective of the treaty is to set up mechanisms for compensation, with southern countries promising to preserve this biodiversity in exchange for expanded development aid programs from the North, notably programs to transfer biotechnology research capabilities and know-how. But each country has been free to exploit its own phylogenetic resources since 1983. If the patentability of living organisms is accepted, there is a strong chance that southern countries will block access to their phylogenetic wealth. Lacking the research capabilities to take advantage of it, some countries have already signed bilateral agreements with big pharmaceutical groups. Examples include Glaxo with Ghana, and most recently Merck with Costa Rica. Merck will go prospecting in the Costa Rican forests for five years and will enjoy a monopoly on the exploitation of all the phylogenetic resources it discovers during that period. In exchange, it will pay the Costa Rican government a \$1 million and promise to make royalty payments on the sale of products developed from genes discovered in Costa Rica. Although most European politicians consider this type of agreement unacceptable, it was nonetheless concluded. Can Merck really file for patents on all the genes discovered in the Costa Rican forest—for a few crumbs—while stripping the country of its genetic wealth with its naive consent? Patents on living organisms raise questions that are too serious to be trifled with. The final European directive should be established before the end of the year. Let us hope that the members of Parliament will have had the time to ask the right questions, in full awareness of their implications.

EC: BRITE/EURAM Advanced Materials Program Evaluated

92WS0710B Paris INDUSTRIES ET TECHNIQUES in French 19 Jun 92 p 38

[Article by Christian Guyard: "The Outcome of BRITE/EURAM"; first paragraph is INDUSTRIES ET TECHNIQUES introduction]

[Text] Research results are good, but are not adequately disseminated.

The first bid invitation for the BRITE/EURAM 2 program elicited nearly twice as many proposals as the previous one in 1990. But according to Mr. Valente de Oliveira, president of the European Communities Research Council, other criteria are needed to claim that the program is really reaching its goals. "The number of completed projects, the number of patents filed for, and the number of small and medium companies participating are all up," notes a pleased Mr. de Oliveira.

BRITE/EURAM is one of 15 technological research and development programs funded (ECU748 million) by the European Community. It concerns materials and raw materials, their design and fabrication, and their specific applications in the aeronautics industry. In this type of program, the EC underwrites the collaboration expenses (meetings, travel, etc.) of the different European partners, to a maximum amount of 50 percent of the program's total cost. An evaluation of over 200 BRITE/EURAM projects was recently presented in Seville and showed that the results of research were very good. But the project's findings were not adequately disseminated or practically applied, either in their own immediate field or in others. This is especially true of the strides made in electrical engineering, which should without question be translated into new products and processes.

The "good" programs selected and presented in Seville are those which truly match market needs, combine short- and long-term considerations, and look at the total product cycle (from design to waste disposal). Moreover, they incorporate "clean technology" (non-polluting and non-wasteful) and computerized and integrated production developments from the outset. The most spectacular example of this approach is the joint European supermagnet project (CEAM). The advent of high-field magnets (neodymium, iron, bore, for instance) could have cost the Europeans a bundle if the Japanese had captured the market. Europe was able to mobilize to develop basic research (a network of 80 laboratories) and more importantly to quickly implement the results through productive interaction with manufacturers. It is a decisive point when you consider that automobiles contain 30 magnets, and that household appliances and other electronic gadgets are big consumers as well.

Boxed Material: Twelve BRITE Projects Were Recognized in Seville For the Quality of Their Results, the Transferability of Their Results to Other Fields, or Their Environmental Features

I. Quality of Results

Project: Sheet-metal welding laser. For use on Airbus planes, car doors, and computer printers. Participants: RTM (Italy), Cetim, Liverpool University, Aerospatiale, Aeritalia, Enea (Italy), Renault.

Project: Liquid-crystal optical memory. To replace current microfiches (photographic) with ones that can be rewritten using infrared laser heat. Participants: Akzo (NL), GEC Research (UK), Laser-Scan Labs (UK), Hull and Leeds Universities (UK).

Project: Liquid-crystal-fiber reinforced thermoplastics. The two polymers are mixed to form a product that is injected or extruded simply. A more resistant material. Participants: Eniricerche (Italy), Battenfeld (Germany), IKV (Ger), Polydata Ltd. (Ireland).

Project: Metal-extraction process. A relatively non-polluting hydrometallurgic extraction process that does not consume much energy. Developed on complex zinc and copper sulfides. Transferable to other metals. Participants: Sofimines Parimines (France), INP Lorraine, Euromin (Italy).

II. Transferable Projects

Project: A flexible system for making shoes. CAM and leather-cutting with water jet. Shortens time getting product to market. Applicable to clothing. Participants: Sepic (France) Isin, Labelle Chaussures, Insafap (Portugal), Iri (Spain), Suteau (France), Leather Technical Center (France).

Project: Permanent supermagnets. A joint effort involving 80 European laboratories to develop an iron-neodymium-boron magnet with samarium base. A market estimated at ECU2 billion in 1995. Participants: Grenoble National Scientific Research Center, Trinity College (Ireland), TU Berlin, Birmingham University (UK).

Project: Computer-aided manufacture (CAM) of injection molds. A series of software programs; dimensioning, machining of a copper form, and hollowing of the mold through electroerosion using a model as a starting point. A factor-10 gain in production time. Participants: WTCM/CRIF (Belgium), Cadco Nv (B), Bell Telephone Manufacture (B), Picanol Nv (B), Cig-Intersys Nv (B), Tecno Design Ltd. (Ire), Biba (Ger).

Project: Glass-cement composites for the building trades. These composites do not age well. A new formula was developed with new glass fibers and special additives. Participants: Pont a Mousson, Cebtp, Armines, Sigma Beton, Forton (NL), Intron (NL), British Cement Association (UK), Inegi (Portugal).

III. Environment

Project: Membranes for industrial textiles. Inverse osmosis films for the recycling of water and bath chemicals. Energy savings. Participants: Separen Spa (It), Peignage d'Auchel (Fr), Texilia (I), Fraunhofer (Ger), Calabre University (It).

Project: Partly plastic auto engine. Construction and testing of an engine incorporating large plastic parts such as crankcases. Reduced weight and noise, fuel savings, less pollution. Participants: Ford Werke, DSM (NL), Ford Motor (UK), Galvanoform (Ger), GKN Technology (UK), National Engineering Lab (UK), Nottingham University (UK), Vetrotex (Fr).

Project: Aluminum recycling. Recycling of manufacturing waste (chips, scraps) through simple extrusion, without remelting. Energy savings. Participants: Alumina Spa (It), Holton Machinery (UK), UK Atomic Energy.

Project: Artificial blood vessels. Polymer tubes are lined inside with the patient's own endothelial cells. Total biological compatibility. Can be applied to digestive,

respiratory, and urinary tracts. Participants: Aix-la-Chapelle Technology University, Deutsches Wollforschungsinstitut; Union Explosivos Rio Tinto (Sp), Vygon (Ger), University of Santiago (Sp), Saint-Antoine Hospital (Fr).

France: Regional High-Tech Industry Assessed

92WS0712A Paris LE MONDE in French

12 Jun 92 p 16

[Article by correspondents Jacques Fortier, Michel Delberghe, Jean-Jacques Lerosier, Jean-Pierre Rouger, Jean-Rene Lore, Jean Verdier, Gabriel Simon, and Ginette de Matha: "The State of Research in France's Regions"]

[Text]

Physics, Chemistry, and Life Sciences in Alsace

Alsations will be able to take part in an actual rally during France's "Celebration of Science." Competitors will have to complete at least three steps and answer questionnaires at the 90-plus laboratories, companies, and establishments that will open their doors to the public. A trip to Kourou, offered by the National Scientific Research Center (CNRS) and the National Center for Space Studies (CNES), is among the prizes.

The stages in the rally reflect the scientific wealth—and especially the wealth of public research—that characterize Alsace. Indeed, the region ranks third in scientific resources, after Rhone-Alpes and Provence-Alpes-Riviera. Some 5,000 people are involved in research, in addition to 700 CNRS researchers based primarily in Strasbourg, but also in Mulhouse. The National Institute of Agronomic Research (INRA) at Colmar and the National Health and Medical Research Institute (INSERM) are also located in Alsace.

All the studies indicate that nuclear physics, life sciences, and chemistry are the three strong points of Alsatian research.

Nuclear and particle physics are long-standing traditions in Strasbourg, which was chosen by Berlin in 1943 as the site of a Cockcroft-Walton accelerator. The creation of the Strasbourg-Cronenburg Nuclear Research Center in 1959 expanded physical research, which now occupies over 120 researchers and research professors. In 1984, the Alsatian scientific and political community was bitterly disappointed at being passed over as the site of the European synchrotron radiation ring, in favor of Grenoble. That bitterness has dissipated now that the 35-million electron-volt vivitron, the most powerful electrostatic accelerator in the world, has been constructed at the CNRS for work in a related field.

The creation 20 years ago of the Molecular and Cellular Biology Institute at the Louis Pasteur University, and the founding in 1977 of Professor Chambon's Eukaryotic Molecular Genetics Laboratory (LGME) were two essential steps in building up life sciences research in

Alsace. Today the LGME is on the cutting edge of genetic engineering research and has helped spin off specialized companies such as Transgene, which has been applying genetic engineering techniques to the agrifood and pharmaceutical industries for 12 years.

The general public became aware of the region's solid life-sciences infrastructure when the Alsatian Jean-Marie Lehn won the Nobel prize for chemistry in 1987. Lehn's organic chemistry and physics lab, which collaborates with physicists and biologists, is just one piece of the picture. Three CNRS units, a mixed unit working on magnetic resonance, and 13 CNRS-associated units are located in Strasbourg; Mulhouse is home to the National Institute of Chemistry in the Upper Alsace University. Strong points include synthetic chemistry and surfaces studies used in the machine industry.

Alsace probably needs to keep an eye on two aspects of its research: cross-border collaboration, which is growing between Alsatian, German, and Swiss universities, and the development of private research. Despite the big companies operating in the region and the involvement of state and local collectivities, private research is apparently still lagging.

Discovering the Diversity of Rhone-Alpes

France's second most important research region, which employs 9,000 in the public sector and about 14,000 in industry, is lucky enough to embrace just about every field in science. Research is concentrated chiefly in the two hubs of Lyon and Grenoble, but is also found in Rhone-Alpes's network of average-size towns. In that sense, the "Celebration of Science," which will inspire 150 events throughout the region, is an opportunity to discover the area's scientific diversity.

True, the picture will be curtailed by the nearly total absence of Lyon's big chemical, pharmaceutical, and oil-industry corporate research centers, where the products of the future are being created. Conversely, the big schools (Centrale, National Applied Sciences Institute, and the Institute of Chemistry and Industrial Physics), and especially the science and medical schools of the University of Claude-Bernard (Lyon-I) will collaborate with the CNRS to give a glimpse of the mysteries they explore, from the infinitely great to the infinitely tiny. Examples include the analysis of biological and socioeconomic systems, chemistry and molecular biology, and work at the Astronomy Institute of Lyon.

The European hub of Grenoble, which specializes in mathematics, physics, biology, and information science, opted to seek out the public by installing a big tent downtown to house the exhibits of several large companies (Bull, Thomson, Merlin-Gerin, and so on). The laboratories of Joseph-Fourier University, the facilities of the National Telecommunications Center (CNET), and high-tech companies in the Meylan technology zone will be directly open to the public. Admittedly, the city of

the Dauphin already has extensive experience in disseminating knowledge, through programs put on by its very active culture, science, and technology center.

Outside of a few specific establishments—the Annecy particle physics laboratory, close to Geneva's CERN [European Nuclear Research Center], or the Atomic Energy Commission installations in Pierrelatte (Drome)—the other regional towns are less involved and are taking a more “down-to-earth” approach. The eco-museums are evidence of the region's industrial heritage, and some departments, such as Ain, are counting on the event to publicize their natural riches. After immersing themselves in an aquaculture station at the Institute for Agronomic Research, exhibition goers will be able to shift their gaze upward and observe the migrations of birds in nearby Dombes park.

Lower Normandy's Cultivated Fertility

Little by little, blue-collar Caen is being replaced by high-tech Caen. While the smokestacks of the Unimetal-Normandie steelmaking plant are slated to disappear by 1994, basic and applied research labs are blossoming everywhere on Caen's northern plateau. “Celebration of Science” will give the city's residents a chance to talk to the 1,000 researchers and research professors of their urban center.

Caen's biggest science facility is GANIL [National Large Heavy-Ions Accelerator]. The joint Atomic Energy Commission/CNRS nuclear physics laboratory was installed in 1974, and attracts physicists from around the world who come to gain a better understanding of how matter and its atoms are organized.

The Caen accelerator is one of the two big European research centers in nuclear physics, the other being Darmstadt, in Germany. “The international scientific community watched with interest as the accelerator and its applications grew. GANIL has become one of Europe's scientific hubs for physicists and has transformed Caen,” explains Claude Detraz, who was GANIL's director from 1982 to 1990. Today he runs the National Nuclear and Particle Physics Institute, the IN 2 P3. Not far from GANIL is the Institute for Matter and Radiation Sciences (ISMRA), where the research on superconducting materials is done. In 1987, Professor Bernard Raveau came within an inch of winning the Nobel prize for physics for his research there.

The third big installation on Caen's fertile plateau is the Cyceron Center (Cyceron is a contraction of cyclotron, chemistry, and positron). Professor Jean-Michel Derlon, a neurosurgeon, is in charge of Caen's biomedical cyclotron, which has been up and running since 1980. The cyclotron studies brain functions and maladies, and will eventually look at heart functioning and diseases using positron-emission tomography.

A very-high-speed, city-wide network for scientific communication, dubbed Vikman, links the three research

centers, the University Hospital Center, the Francois-Baclesse Anti-Cancer Center, the university, and—a bit farther out from the center of town—the Post Office and Telecommunications Joint Research Center (SEPT).

SEPT employs 200 people who specialize in electronic mail and various plastic money applications. It will be one of the focal points of the “Celebration of Science” event and will open its doors to hundreds of college and high-school students.

Agrifood is another area of research concentration in Caen. The Institute of Applied Biological Research (IRBA), which does biotechnology research, is a notable example. The multiplicity of research centers in the field promotes synergy between research institutions, universities, and the technopolis. Synergia embraces companies of all sizes who are innovation-oriented. The Moulinex European Research Center, which dreams up the household products of the year 2000, is one of its driving forces.

Jean-Claude Fenyo, the director of the CNRS's regional delegation for Normandy, is always anxious to point out that this swarm of scientific and technological activity contains “an element that does not get much attention: human sciences research. [We have] two CNRS laboratories that include the geomorphology and medieval archeology research centers.” It is true that Caen was once nicknamed the Athens of Normandy.

Fisheries Science in Nord-Pas-de-Calais

Algae salad and a main dish of rattail fish will be available for the dining pleasure of visitors to the Nausicaa Ocean Center in Boulogne-sur-Mer during the “Celebration of Science” days. Rattail is a deep-sea fish that is caught at depths lower than those usually trawled, and which the industry has discovered can be profitably marketed.

With the help of IFREMER, Nausicaa will be one of the highlights of the Nord-Pas-de-Calais region's “Celebration of Science.” Students and the general public will be able to view all aspects of fisheries science, from [weather research] during visits to Meteo-France's Nausicaa center, to the trawling techniques of yesterday and tomorrow. IFREMER's summer tank, the only hydrodynamic one in Europe, will be open to the public. Aquaculture turns seas into big fields, and one of France's biggest aquaculture farms is being developed in Gravelines, a few kilometers from Boulogne, in the reheated waters near the nuclear plant. In addition, Nausicaa is presenting the work of “sea farmers” in a mini-hatchery of sturgeons, which are an endangered species.

A whole series of events—of which “Celebration of Science” will be only an abridged version—is being organized in Nord-Pas-de-Calais. It will be centered around Nausicaa, the Fourmies Eco-Museum, the Lewarde Mines Center, the Regional Nature Areas Center, and Alias. Alias was created in 1984 by a physicist, Bernard Maitte, and a mathematician, Michel

Perreau, who is now a special project head at the Université du Littoral. The association seeks to present science and technology in ways that are not solely academic—by appealing to people's emotions, sense of fun, and play. Alias will soon occupy 4,000 square meters in Villeneuve-d'Ascq, and has developed "exploration kits" (mini-exhibits) on images, symmetry, the cosmos, etc. The kits have traveled France, and in some cases, the world.

The region's zeal to popularize science and technology may be a way of exorcizing its handicap. Nord-Pas-de-Calais is seriously lagging in research activity. The region accounts for 7 to 8 percent of France's population and GDP, but only about 2 percent of its research potential. And even that 2 percent is the result of an aggressive, very high-profile policy of promoting research that dates back several years. Laboratories in Lille, Boulogne-sur-Mer, Maubeuge, and Valenciennes now employ 2,500 researchers. Regional specialties are beginning to emerge, and are being shored up by the creation of new centers. Examples include the Northern Electronics and Microelectronics Institute (IEMN) at Villeneuve-d'Ascq and the Valenciennes Laboratory of Automation and Mechanical Sciences. The IEMN combines teams from Lille Catholic University (ISEN), the public universities of Lille and Valenciennes, and the Pasteur Institute.

The Fate of Provence-Alpes-Riviera Tied to Sophia-Antipolis

The University of Nice-Sophia-Antipolis is thinking about creating a subsidiary. Its purpose would be to serve as an interface between the university and companies, to develop research exchanges. The creation of such a spinoff illustrates the ties between public research facilities and companies, which the university describes as "excellent." A study of the Nice-Riviera Chamber of Commerce and Industry's economic watch committee, Sirius, notes that 40 percent of the firms involved in research and development are partners with public laboratories.

The development of research in the Maritime Alps is a fairly recent phenomenon, dating from the creation of the university in 1965. The Sophia-Antipolis technology hub was created in the early seventies. "Because there was no history of research here, there was no weight of tradition or prior orientation to be respected," explains Jean-Pierre Laheurte, the vice-president of the university. "We and the companies that were converging on Sophia were faced with the same problem: our isolation from the big research centers such as Marseille or Paris. A sense of solidarity sprang up." Today that solidarity has become concerted action.

Public research in the region focuses on sciences and techniques. It employs 1,500 researchers associated with different establishments. They include: the University, the Riviera Observatory (Nice, Grasse), the Ocean Studies Observatory (Villefranche-sur-Mer), the

National Institute for Data-Processing and Automation Research (INRIA, Sophia-Antipolis), the National Institute for Agronomic Research (INRA, Antibes, Sophia-Antipolis), the CNRS (Sophia-Antipolis), the School of Mines (Sophia-Antipolis), the French Energy Control Agency (Sophia-Antipolis), and the National Institute for Health and Medical Research (INSERM, Nice, Villefranche-sur-Mer).

It is harder to come up with a listing of private research activities. The chamber of commerce watch committee has counted 200 companies that are "truly dynamic technologically." They employ about 4,000 people in their "research and development" divisions. Nearly half of the research units are located in the Sophia-Antipolis technology hub, and 28 percent are established in La Gaude and Vence, north of Nice. The main fields in which they work are information science, electronics, telecommunications, chemistry, health, the oceans, and the environment.

The activities of the Sophia-Antipolis technohub determine the main lines of research. Riviera Development, a general consulting firm to attract companies to the area, is targeting the high-technology sector.

Public/private sector synergy, the Riviera environment, and the quality of the university's research all lend a certain vitality to research in the Maritime Alps. At 62.84 percent, the ratio of research staff as a percentage of all employees is more than 10 points above the national average.

Plant Biotechnology in Auvergne

Many companies here have involved the University in their research department's work. The Limagrain group, which is located in the heart of Limagne, north of the regional capital, is the top producer of seeds in France, and the third-largest in the world. It has realized that the new markets for plant products will not be found solely in the food industry, but also in the health, cosmetics, fine chemistry, and bioproducts fields.

So Limagrain, which has incorporated these new demands into its research plans, is working in close collaboration with the university in Clermont through its BIOCEM laboratory located on the university campus. Thanks to BIOCEM, Limagrain now masters the principal biotechnological techniques for plants and microorganisms.

Limagrain signed an agreement with the CNRS and Blaise-Pascal University to officially create a research group on the molecular biology of higher plants (Biomove) on 28 April. The group will continue to work in molecular genetics and biotechnologies. But it will focus specifically on *Arabidopsis thaliana*—a definite weed, but extremely important to the future of plant biotechnologies as an experimental material.

Biomove will investigate possible advances in plant hybrids and "genetic identification cards." The state and

the Auvergne regional council have supported the initiative, which is part of an effort to develop a regional research hub in plant biology.

The Mystery of Algae in Brittany

Brittany is the first European center for research into marine algae. The world of algae is still largely unknown, which contributes to the stock of mythology that surrounds these tiny sea plants. Algae are thought to be good raw material for increasing scientific knowledge, inasmuch as they are one of the best fields of inquiry for piercing the mysteries of the plant world and of biology. In this region teeming with the sea flora, research is getting organized, as evidenced by the international symposium scheduled for 16-21 August in Brest and Saint-Malo. In Nantes, Roscoff, and Brest, 15 scientists are doing work in genetic biochemistry and cellular biology. Brittany has come a long way from the days when seaweed was harvested with a reaping-hook and spread on the fields as a fertilizer. The researchers are striving to select species and work on the full genome of algae, to create—through genetic manipulation—"transgenic" algae that have inherited traits from other congeners. "We have before us a plant world about which little is known, and that is why we think we will find some interesting things," stresses Bernard Kloareg, research director at the CNRS and biologist at Roscoff.

Besides these basic researchers, Brittany has technicians responsible for managing the natural resource (in IFREMER) and adding value to the industry (as in Pleubian, Cotes-d'Armor). For the economic uses of algae can apparently be substantially expanded. That does not mean, however, that the algae industry is at a loss. People have been putting the sea plants to use for 300 years. In the 17th century, they were employed in glass-making. In the 19th century, and until 1930, iodine was extracted from algae. Now technicians primarily remove alginates and carrageens, two compounds that are widely used in industry, in textiles, tablets, welding rods, toothpaste, gelling agents, and food thickeners. Algae are even eaten regularly, under the guise of E407, which are carrageens used in large quantities by industry during the winter.

The growth sectors for algae are the food, pharmaceutical, and cosmetics industries. Industry already knows how to make foliar fertilizers, chocolate, cooked meats, anti-aging creams for the skin, bath products, soup, and prepared dishes using algae. Brittany even exports to Japan a variety of algae—wakame—that is cultivated in the clear waters of Ouessant.

Composite Materials in Aquitaine

Two prize members of the Aquitaine military-industrial concentration, Aerospatiale (Saint-Medard-en-Jalles) and the Atomic Energy Commission-CESTA (Le Barp), will try to reconcile the demands of military secrecy and public access for the region's "Celebration of Science."

Economic times are tough for Aerospatiale. The Saint-Medard-en-Jalles establishment has been hurt by the downsizing of France's military program (cancellation of the S45 surface-to-surface missiles and the Hades missile) and is trying to highlight its links with Aquitaine research, notably in the field of high-performance composite materials. Indeed, Aerospatiale maintains a permanent relationship with most of the region's laboratories. Its Girondin unit also works for the civilian research industry, and put together the Anthrorack space medicine lab that can perform checkups on humans under conditions of weightlessness. Anthrorack will be tested during the German D2 manned mission.

Aerospatiale also took part in an exhibition put on by the plastics specialists of the Matiere prochaine shop, which is run by Bordeaux's Jacques Bernar. Entitled "Rocket Rocks," Matiere prochaine's and Aerospatiale's exhibition recreates the interstellar universe.

The Atomic Energy Commission-CESTA in Le Barp aims to "repair the image of nuclear science" through a headline exhibition held in the Aquitaine regional council hall. The French Nuclear Energy Society initiated plans for the exhibition, which is entitled "Atom Lights," a year ago. Electricity of France, the General Nuclear Materials Company, the Atomic Energy Commission, Framatome, Pechiney, and the National Agency for Radioactive Waste took part in assembling it.

European Supercomputer Industry Discussed

Competition With US, Japan

92WS0735A Duesseldorf VDI NACHRICHTEN
in German 3 Jul 92 p 1

[Article by Wolfgang Mock: "Supercomputer: Race for Key Technology of Future Begins"—first paragraph is VDI NACHRICHTEN introduction]

[Text] Duesseldorf, VDI-N, 3 Jul 92—Europe is still well ahead in the race for parallel computers, but the Americans and the Japanese are catching up with massive research programs.

Worldwide, the big computer manufacturers are today preparing for a new technology that is viewed as the key technology of the next century: the massively parallel supercomputer.

Supercomputers are at present still divided into three large categories: multivector computers, minisupercomputers, and parallel computers with shared memory. "Computers of this class are pointing the way to further development in the field of top-performance computers. The computer performance that will in future be required for major applications can only be achieved through top-of-the-line parallel systems," the Society for Mathematics and Data Processing (GMD) in Bonn says in a report written for Minister of Research Heinz Riesenhuber.

A few big manufacturers at present dominate the multivector computer market: Cray, Fujitsu, Hitachi, and NEC. Among the manufacturers of minisupercomputers are: Convex, DEC, Floating Point Systems, and Alliant.

While the multivector computer market is almost entirely in the hands of the Americans and the Japanese, European manufacturers are still assuming a leading role in the still considerably smaller, but dissimilar, yet promising for the future, market for massively parallel computers. In this field there are a number of European manufacturers, like Telmat in France, Meiko and Parsystec in Great Britain, and Parsystec in Aachen. But here too, American firms are already gaining ground. According to the GMD report, the U.S. firms, Intel and Thinking Machines, each control about 30 percent of the world market, while Meiko and Parsystec each control 10 percent of it.

U.S. manufacturers' relative success with parallel computers as well and the bitterly fought-for market by no means allow European manufacturers to take their survival for granted. Despite massive state aid, the German Suprenum Company has not even made the leap into the market with the development of a parallel supercomputer. But this also applies to American manufacturers. Formerly successful with the sale of minisupercomputers, the firm of Alliant went bankrupt last month, six months after it had introduced its first massively parallel computer.

In addition to this, there is the fact that manufacturers of conventional multivector computers, like Cray, are pushing for massively parallel systems in the market. "No one knows who is going to survive the next five years," is how Karl Solchenbach of the PallasCompany described the current situation at the "Supercomputer 92" conference last weekend in Mannheim.

The currently most powerful multivector supercomputers still cost between \$25 million and \$30 million. The authors of the GMD report certainly fear that there will in future be a price war between American and Japanese manufacturers of multivector computers in the European market. This might result in European industry and research's buying more of this class of computers because of the prices. If this happens, not only would European manufacturers' massively parallel systems be harmed, but also "the changeover to parallel computing, which is being intensively pushed in the United States and Japan, would be lastingly delayed in Europe with possibly fatal consequences for the European industry's ability to compete."

But at the present time the European industry is having difficulties in finding a common course of action. Despite years of aid for the European version of the parallel computer processor—the transputer—from the European Community (EC), a tendency is currently becoming apparent in the EC to promote only the use of massively parallel systems, but not the development of an independent European industry.

EC Support Policy Criticized

92WS0735B Duesseldorf VDI NACHRICHTEN
in German 3 Jul 92 p 2

[Article by Wolfgang Mock: "Policy for Promotion of Supercomputer Disputed"—first paragraph is VDI NACHRICHTEN introduction]

[Text] Mannheim, VDI-N, 3 Jul 92—Europe lacks an industrial policy perspective for top-performance computers. The Ministry of Research is planning to build a reference center for parallel computers in Bonn.

"Supercomputers," said Bernd Reuse, responsible for data processing at the Ministry of Research, "are a key technology of the very immediate future." "Supercomputers," said Robert J. Paluck, the head of the American computer manufacturing firm, Convex, "are strategic weapons for the economic superpowers, the best weapons in the battle for future markets."

Both of them think the same, but the ways in which they express their views represent different commitments. The supercomputers of the future will no longer be multivector computers, but computers in which many thousands of processors carry out parallel computer operations: the massively parallel systems (VDI-N, Nov 92). And while the U.S. Government is providing this new technology and the peripherals that go with it, like networks, software technology, and training, with nearly \$600 million in aid in 1992 alone, at least outwardly Reuse appeared to be cautious: "We think that the industry is in a position to deliver these (massively parallel) computers on its own."

Internally, however, the Ministry of Research, too, is trying to help the German industry to get back on its feet, in connection with which there is only one manufacturer in the Federal Republic in the field of massively parallel computers that is to be taken seriously: Parsystec in Aachen with barely 150 employees. This is why Reuse, in an internal Research Ministry report on "The Research Concept of Top-Performance Computers," proposes that a reference system for Parsystec computers be set up at a major research center "as quickly as possible." He can find support for this in the proposals of a German Research Association committee of experts, which has proposed to the minister for research that a testing facility for 2,000 processors and parallel computers be established. Only the Society for Mathematics and Data Processing in the vicinity of Bonn should, of course, be considered as a location for it. On the one hand, because supplementary funds for the establishment of such a reference center could flow from the budget appropriation for "science city, Bonn," and, on the other, because Nordrhein-Westfalen has been intensively promoting research in the field of massively parallel computers for a long time now.

Construction of such a reference system, which should have a performance envelope of 50 gigaflops (50 billion computer operations per second), will cost about DM30

million. But the Ministry of Research hopes to be able to extract considerably larger sums from the Brussels budget appropriations for aid through this preliminary outlay.

Headed by Nobel Prize winner in physics Carlo Rubbia, a committee of experts composed of European experts has now proposed that more than DM11 billion be spent Europe-wide over a period of seven years for the use of massively parallel computer systems: for new applications, the development of software tools, the extension of networks, training, and just the construction of demonstration centers.

But the Rubbia committee's proposals have a serious shortcoming: That development of and support for a European supercomputer industry play "no role" in their plan is the criticism leveled by Hans Martin Wacker, himself a member of the committee and the director of the Central Data-Processing Department of the German Institute for Air and Space Research (DLR) in Cologne. According to Wacker, "it's a plan from which the most important element is omitted, namely the computers themselves."

This means that new applications will, to be sure, be developed in Europe, but the computers will have to be bought in the United States. "The difference," Wacker commented on the situation, "is that the Americans have set themselves promotion of the development of a competitive parallel computer industry as their primary goal. This direction of attack is lacking in the Rubbia committee's plan."

[Box, p 2]

Billions for Parallel Computers

Supercomputers for the simulation of social and climatic, technical, and natural science processes are to be regarded as constituting one of the most important key technologies of the coming decades. With thousands of processors operating in parallel, these computers should be performing a billion computer operations a second by 1995 at the latest. And the Europeans are still well in the lead in this race.

The EC must spend DM11 billion in grants over the next seven years so that it will remain in the lead, according to the recommendation of a committee of experts headed by Nobel Prize winner in physics Carlo Rubbia. This is just under DM1 billion less than is available for the entire EC program for aid for high technologies for 1990-1994. In view of the size of such a sum and the EC's limited resources, the Rubbia committee's recommendations scarcely have any chance of being fully implemented.

They are certainly also remarkably short-sighted in terms of industry policy. For nearly two years now, the European Community has been working on a strategy for the

industry's policy that will not, to be sure, directly subsidize European companies, but that clearly aims for an increase in these companies' competitiveness in its direction of attack.

This is completely lacking in the Rubbia committee's plan. In it there is no mention of the development or strengthening of a European parallel computer industry. Dominated by pure research in physics, Rubbia's team is not interested in where these top-performance computers come from. But in so doing it has also avoided all current political trends in its arguments. And scientists should no longer allow themselves to behave in this manner today.

CORPORATE ALLIANCES

Prospects, Background of Volvo/Renault Fusion

92WS0655A Munich TOP-BUSINESS in German
Jun 92 pp 66-73

[Article by Thomas Luber: "Renault-Volvo: Love Out of Utter Necessity"; first paragraph is TOP-BUSINESS introduction]

[Text] After an alliance of barely two years, the two auto companies Renault and Volvo are on the verge of merger. A show of strength in which the new Renault head Louis Schweitzer will wield the baton.

Chairman Pehr Gyllenhammar of AB Volvo (1991 annual sales: almost 20 billion German marks [DM]) could hardly put his satisfaction into words on 29 April. The alliance with the Regie Nationale de Usines Renault S.A. (annual sales: about DM50 billion) established in September 1990 by him and then Renault leader Raymond H. Levy, has "fulfilled Volvo's dearest dreams," he informed the stockholders at the general meeting of the traditional Swedish company.

Even then, this account no longer corresponded to the actual facts. Because all that had been fulfilled were the long rampant speculations that the alliance of the two automakers would one day lead to a common company; according to a letter from Volvo's board of directors to the members of the managing board, the two companies intend to increase their mutual capital participation this summer. The heads of the two companies are convinced that that is the only way to eliminate the major deficiencies of the partners, i.e., inadequate sales and lack of a global presence.

Gyllenhammar's personal ambitions: To save the autonomy of the traditional Swedish company, which the 57-year-old has governed absolutely since 1970, beyond the year 2000 or to assume leadership in a merger with another company, have fallen by the wayside. Because if the trial marriage between Renault and Volvo becomes a union for life, the new Renault chairman Louis Schweitzer, selected on 22 May, will

have the controlling interest and be top dog; Pehr Gyllenhammar will have to take second place.

Gyllenhammar has thus lost a high-stakes poker game which began on 23 January 1990 when he and Levy publicly announced their planned alliance in Amsterdam. Secured by capital participation, the two companies intended to overcome all future perils of economic life together according to the basic idea of the agreement. "We can survive without having to face the alternative of eating or being eaten," was Gyllenhammar's euphoric comment.

Too Small To Survive

The Volvo chairman had sought such a partnership for years. It had long ago become clear to the crafty strategist that his company lacked the volume to survive as an independent producer of automobiles, commercial vehicles, and aircraft parts. Ever since the mid-1980s, when his attempt to create a biotechnological pillar for Volvo failed miserably with high losses, he had been seeking a suitable partner company.

It was no accident that his selection was Renault. The French national company still held a rather large package of Volvo shares through the mid-1970s; at that time Gyllenhammar also still had friends in France, such as the current president, Francois Mitterand. The offer was also not inconvenient for Levy, called to head Renault in 1986. And not just to elude the influence of the government which has been stifling every company initiative.

Renault itself has been seeking a partner since the mid-1980s because the company was getting by as the only European automaker with a single trademark and exclusively from the auto business. Another shortcoming: The French are present, practically speaking, only in Central and Southern Europe. Levy first flirted with a Japanese partner, but the French Government opposed this notion.

High Potential for Synergy

Thus the Renault leader finally agreed to Gyllenhammar's offer, particularly because the product catalog of the two companies does not overlap: In both the car and truck sector, Renault is primarily involved in the lower and middle range whereas Volvo almost exclusively sells upper range cars and heavy trucks. The two complement each other in terms of geography as well: Volvo (major sales territories Scandinavia, Great Britain, U.S.) and Renault (Central and Southern Europe).

Outwardly, cooperation has been concentrated in three areas:

- **Components:** In 1991 Renault equipped Volvo with 93,500 diesel units and 82,000 transmissions; Volvo intends to deliver 100,000 series "N" modified gasoline engines per year beginning in 1993. Already, 16,000 panels for the understructure of the "Clio" are supplied each week from the Olofstrom Volvo plant to the assembly lines of the Renault plant in Flins.

- **Purchasing:** The partners buy approximately 20 percent of their vendor parts jointly to obtain better prices. The twosome have divided up this business: Volvo deals with Robert Bosch GmbH for Renault S.A., Renault with Michelin and Valeo for its Swedish partner.
- **Sales and marketing:** Wherever reasonable, the national dealer networks are supposed to complement each other. Renault intends to promote the sales in France of the Swedish auto, which have been rather sluggish for a long time; Volvo, its partner Renault in its domestic market of Scandinavia.

However, both partners had more in mind from the very outset than this rather banal form of cooperation. After all, no alliance would have been necessary for this current type of cooperation. In fact, Volvo used to buy its diesel engines from Volkswagen without any plans for entering into a partnership with Wolfsburg, and since 1970 Renault has been producing engines with Peugeot without the two arch competitors becoming any closer because of this.

Gyllenhammar and Levy wanted their partnership—although announced as only an alliance at that time—to be understood from the outset as a single business entity. As early as last fall, the clear message went out to all management employees "to work in the future as if Renault and Volvo were a single company." Anyone who did not wish to support this policy—such as Volvo's former chairman of the board Roger Holtback or the former Volvo managing director and current head of development for Audi Gunnar Larsson—had to leave the twosome.

Each company has been involved in the decisionmaking process of the partners since the beginning of the alliance. Thus, Pehr Gyllenhammar and his new chairman of the board Soren Gyll have seats and votes on the managing board of Renault S.A.; correspondingly, Levy successor Louis Schweitzer sits at the management table of AB Volvo.

The intention to move beyond an alliance to merge the two companies thus existed from the very beginning. Amaury-Daniel de Seze, board member at AB Volvo and liaison with Renault, leaves no doubt about that: "The alliance boils down to increased participation." However, economic pressure has caused the merger to occur earlier than planned.

Because, whereas Renault chairman Raymond Levy successfully managed to rejuvenate the model offerings of his company and to increase production and thus, albeit with the help of the extraordinary boom in unified Germany, to improve the economic base of Renault S.A., Volvo has been inexorably sliding into the red.

Renault Overtakes Its Partner

Because of the fact that sales in its largest markets U.S., Sweden, and Great Britain collapsed, in 1991 alone the

Swedish automaker had to cut back its auto production by almost 20 percent compared to the previous year, to 275,000 units. Consequently, sales dropped to 77 billion krona (still 91 billion in 1989); operating results fell to -1.2 billion krona.

Gyllenhammar's last attempt to bring this financial imbalance back into equilibrium—and to secure his ambitions for the chairmanship of a joint company—failed. The economic tycoon accustomed to power wanted to merge his company out of hand with the food conglomerate AB Procordia (annual sales: more than DM10 billion), of which Volvo had obtained more than 40 percent of the shares at the end of 1989 in exchange for the transfer of its subsidiaries Provenda and Pharmacia. With this coup the automaker would not only have significantly reduced his financial problems—because of Procordia's full coffers—but would have also been able to carry more weight in a merger with Renault.

However, to Gyllenhammar's astonishment, the Swedish Government, which holds the second largest group of Procordia shares, refused to approve the merger. This takeover would have completely contradicted Prime Minister Carl Bildt's privatization policy to open the country to foreign investors. Thus it became clear that Gyllenhammar would have to settle for the role of junior partner in a merger.

On the other merger front—Renault-Volvo—the French Government was also causing problems. Above all, Prime Minister Edith Cresson, who was removed from her post in April, vehemently fought against a closer union of the two automakers, feared that the Japanese Mitsubishi Corp., which has been linked by a joint venture with the Swedes since 1990, could obtain some influence over Renault.

Learn From Japan

In fact, this Japanese-Swedish cooperation interests Renault's new chairman Louis Schweitzer. Beginning in 1993 about 200,000 small cars are to roll off the assembly lines of the NedCar joint venture in the town of Born in the Netherlands, half bearing the Mitsubishi name and half bearing Volvo.

Renault will not only be able to supply all the diesel engines and approximately half of the transmissions; the engineers at Boulogne-Billancourt can also profit in this manner from Japanese quality assurance and production organization. This is a pragmatic attitude which the new French Prime Minister and former Minister of State for Economy and Finance Pierre Bérégovoy shares. He is therefore no longer placing any obstacles in the way of closer cooperation with Volvo.

In the now imminent merger Renault will assume operational responsibility for the automobile sector, in which the French automaker is already making more than 80 percent of its sales. The Swedish partner is to head up the truck sector in which a third of Volvo's business originates.

The future joint company does not have too much time to consolidate its forces profitably. Both companies are already in the red in the truck sector. Especially the American commercial truck subsidiaries Mack (Renault) and Volvo GM Heavy Truck are booking high losses. And if Renault should fall back to its former market share in Germany in automobiles, the profits would also disappear in the auto sector.

In any event, the Swedish-French couple no longer has any time—the experts formerly suggested 10 years as the time needed for a successful merger.

CORPORATE STRATEGIES

Alcatel-Bell's Strategy, Operations Evaluated

92BR0499A Antwerp DE FINANCIEEL-
EKONOMISCHE TIJD in Dutch 5 May 92 p 11

[Article signed G.U.M.: "Telecommunications Group Alcatel-Bell in Perfect Financial Health"]

[Text] Antwerp (TIJD)—Alcatel-Bell has produced good results. Despite a promising start in 1992, Chairman and Managing Director John Goossens advises caution because of increasing competition and the slowing down of the economy. Furthermore, the halving of the investment allowance level and the writing off of the social restructuring which took place in the eighties will negatively influence the results of the group in 1992.

These last two factors will ensure that Alcatel-Bell will change from being a modest taxpayer to becoming a major taxpayer again, says Karel Verbinen. That will not prevent Bell Telephone—the legal body—from being and remaining a very healthy undertaking, according to the group's financial director. Debts to financial institutions are barely 3 billion, while the credit lines are about four times that amount.

The actual equity-to-loan capital ratio is just under 0.7, despite the fact that a maximum of 15 percent of the profit can be reserved, the rest being required by the parent company. The pay out ratio with other Alcatel subsidiaries sometimes almost approaches 100 percent. The consolidated balance gives a distorted picture, says Verbinen, because it is strongly influenced by various internal transactions within the group. For instance, Bell cofinanced the acquisition of Rockwell in the United States via Alcatel Denmark, and granted a loan to the parent Alcatel company.

On Monday, Bell Telephone Manufacturing Company, subsidiary of the French Alcatel, published its first consolidated results. In 1991 Bell's consolidated revenues amounted to 32.9 billion Belgian francs [Bfr] and its consolidated profits, part of the group, to Bfr3.1 billion. R&D produced 17.3 percent of the turnover, and the number of employees in Belgium was 7,450. The figures for 1990, which are not comparable as they were

not consolidated, were respectively 31 billion and 2.7 billion, 23 percent, and 7,700 employees.

The consolidated revenues only refer to those companies in which Bell has a participation of 50 percent or more. If participations of 20 percent or more in other companies are included (for the joint ventures in China, Russia, Turkey and Orda-B in Leuven), the group has a combined turnover of roughly BFr45 billion and a global staffing level of 11,100 people. Nearly all the subsidiaries and joint ventures contributed to the favorable results. BRAINS (services) and Bell ITS (system integration) should come out of the red within five years.

Bell Telephone

Bell Telephone, the Belgian parent company, saw its revenues grow by 5.6 percent to BFr26.8 billion; net profit even grew by 7.2 percent to BFr2.3 billion. R&D represented 25.2 percent of revenues and exports took 56.6 percent. In other words, the Belgian—that is to say, government—contracts remain very important to Bell. "It is inconceivable that we could strengthen our position in foreign markets if the internal market were to disappear as a reference," says Chairman John Goossens.

According to the chairman, the 1991 results were already affected by the unfavorable global economic climate and the increasing competition on the telecommunications market. In this respect, he pointed to the financing of the Russian contract which fails to materialize and the reduction in the number of orders at the end of 1991. The arrears in the order book were, however, made up during the first quarter of this year primarily through 880,000 new lines in Mexico.

According to Goossens, another concern is the constant pressure on employment levels as a result of technological development and the increasing automation of production processes. In addition, there is the general tendency to reduce prices (-25 percent for the new, as opposed to the old, RTT contract) and wage increases (up 30 percent between 1989 to 1991). As is already known, at the beginning of this year Bell decided to dismiss another 75 office employees and 186 shopfloor workers. The chairman is therefore not prepared to make any guarantees about employment.

SDT/Mietec

Bell-SDT, in which the Wallonian investment company still has a 25-percent stake, made a consolidated turnover in 1991 of BFr3.3 billion (up 12 percent) and a profit of BFr126 million, double what was made in 1990. Here, too, R&D (27.1 percent) and export (59.5 percent) are very important. The number of employees rose slightly to 750. Together with Bell Telephone, Bell-STD will in the future control 50 percent of the Belgian mobile telephone market. The signing of the contract will have to wait because the Belgian Government and Belgacom are giving priority to their management contract.

For Mietec, 1991 was a key year. For the second time in a row, a profit was made. Sales revenues rose to BFr3.1 billion, whereas the profit was almost halved to BFr255 million. According to the Bell chairman, this is due to the very heavy investment costs. At the end of 1991 the building of a second factory was begun and this tied up an investment of about BFr4 billion. A great deal of money will also be pumped into the development of new technologies in order to be able to tackle submicron technologies as of 1993, according to Goossens. The Bell group will invest BFr14 billion in R&D this year and next.

Bull Plans 2 Billion Franc Capital Increase

92BR0463 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 14 May 92 p 4

[Text] The French computer manufacturer will proceed with an increase in its capital, by permitting its shareholders to subscribe up to the extent of their share holding. Bull should thus receive Fr2.076 billion, after the Fr2 billion allocated by the government in 1991. This operation will be followed by a capital increase of \$100 million, reserved for IBM as part of the agreement made at the beginning of the year. The public authorities have not waited for the results of the enquiry by the Brussels-based EC Commission, which is to rule on the contributions of capital to Bull. A member of the Commission said that the operation needed the EC Commission's go-ahead, which has not yet been given. The commissioner said that Bull cannot go ahead without its ruling, despite Bull's assertion to the contrary.

Philips Expects Slow Market Growth for Interactive CD

92BR0470 Antwerp *DE FINANCIËLE-
EKONOMISCHE TIJD* in Dutch 12 May 92 p 12

[Article: "Philips Anticipates Slow Growth for Interactive CD; Faster Penetration Expected by 1995"]

[Text] Eindhoven (Reuter)—It will be some time before the interactive compact disk (CDI) gets off the ground in Europe, according to Philips Electronics NV. "The initial market penetration will be very slow, but after a few years we expect a growth which will approach that of the audio CD," said Gaston Bastiaens of Philips Interactive Media Systems. By "after a few years," Philips means 1995.

CDI is a hybrid system in which video images are stored on a CD and to which sound can be added. By means of a special camera, photographs can also be included and subsequently displayed on the screen. The system combines the storage of digital pictures, sound, and text on an optical disk with interactive computer control on a monitor screen.

The CDI players and software were launched in the United States in October last year and in Japan in April. At the beginning of May, Great Britain was given the

privilege of being the first test market in Europe. The rest will follow in the autumn. In the United States, CDI players cost less than \$1,000 (34,000 Belgian francs [BFR]) and the software is available for as little as BFR450 to BFR2,000.

CDI is one of the first products of the age of multimedia. Quite a few hardware suppliers are not finding it easy to market products which are subject to fast technological change. Philips has had a great deal of difficulty in marketing the concept, which is not as simple as previous consumer products. Philips itself is having to provide most of the effort required for the launching of the concept.

According to Bastiaens, the reason why the launching will be sluggish in the beginning is because of the public's slowness in becoming accustomed to such new products. Not until 1995 will sales speed up, three years after the introduction, says Bastiaens "because by then awareness of the product will be greater and there will be sufficient software available."

Philips is determined to play the role of world leader in the field. Philips developed CDI together with the Japanese groups of Matsushita Communications Co. and Sony Corporation, but is the first to get onto the consumer market.

In order to achieve a share of the market and to be ahead of the competition, Philips has already set up a number of subsidiaries which are primarily involved with software design, publishing, copyright acquisition, and the sale of professional CDI production systems. Know-how for software design is strongest in the United States, said Bastiaens, hence the start in the United States. Some 50 disks are now available in the United States, 34 in Japan and 32 in Great Britain. Because of this limited selection, Philips supplies a packet containing games and disks for children with every CDI player sold.

By 1995, Bastiaens expects the number of titles to soar, although investment in copyrights will be high and swallow up profits of the initial start-up years.

Philips has one player on the market at the moment on which both audio CDs and CDIs can be played. The photograph application is expected later; these disks are being developed in cooperation with Eastman Kodak Co.

By Christmas, a new generation of CDI player will be on the market, which will be capable of playing a 72 minute film on disk. Philips will make a small charge for updating players now on the market.

Volkswagen Increases Investment in New Laender *92MI0584 Bonn DIE WELT in German 13 Jun 92 p 10*

[Text] With a strong industrial background, the town of Chemnitz is now gaining new momentum. Volkswagen managing director Karl H. Hahn and Minister of Trade and Commerce for Saxony Kajo Schommer laid the foundations for a new engine factory there yesterday. The project will cost between 700 and 800 million German marks [DM], making it Volkswagen's second most important undertaking in the new laender after the Golf factory in Mosel, near Zwickau where Volkswagen is investing a total of DM4.6 billion.

"This is the most modern engine plant in the world," said Hahn speaking in terms of production, quality, productivity, and costs. When completed in the summer of 1994 the factory will have 550 employees working in three shifts with a daily output of 2,000 four-stroke engines in the 1.2, 1.4, and 1.6 liter cylinder capacity. Volkswagen has been manufacturing engines in Chemnitz since the summer of 1988 where it has manufactured 200,000 engines under license for Trabant, Wartburg, and Barkas automobiles.

Shortly after the unification of Germany the firm that later took the name of Motorenwerk Chemnitz GmbH was manufacturing under license for the Volkswagen group. The company was then taken over by Volkswagen and should be incorporated into Volkswagen Saxony GmbH by the end of this year. A company for cylinder head gasket production based in Eisenach is also part of Volkswagen Saxony.

Hahn, who is to retire soon and did part of his apprenticeship in Chemnitz, sees the commitment as "playing an important role in the reconstruction in eastern Germany." His company employs 3,100 people in eastern German plants, a number that will be more than 5,100 at full production capacity. Altogether, Volkswagen will guarantee more than 35,000 jobs between Rostock and Radebeul [near Dresden]. An important contribution to these figures comes from takeovers that should reach DM1.5 billion this year, doubling last year's figure.

Volkswagen, which has outdistanced Opel in the new laender, is now reaping the benefits of its investments. According to as yet unpublished new automobile registrations, the company acquired a leading market position for the first time in May. In Europe, Hahn expects to achieve a market share of "17.5 percent and over," after last year's 16.5 percent.

Volkswagen, which is already in Czechoslovakia with Skoda, now aims to gain a foothold in Poland. The Polish Government is reportedly interested in holding talks with Volkswagen regarding the takeover of an automobile factory in Poland. Although no contract has

been signed, Hahn appears to be satisfied: "We are pleased that we have maintained a leading position over our worldwide competitors."

Dassault Hopes to Increase Civil Market Share
92WS0611A Paris L'USINE NOUVELLE in French
28 May 92 p 23

[Article by Jean-Francois Jacquier: "To Make up for Difficulties on the Military Market, Dassault Wants to Stimulate the Civil Market"—first paragraph is L'USINE NOUVELLE introduction]

[Text] Customer support calls for a special effort. And the Falcon market can be extended toward the military.

It is a tough music score that Serge Dassault just handed over to his new director of civil aviation, Jean-Francois Georges. Georges, 52, a graduate of the Higher School of Aeronautics—with such a passion for jazz that he plays the saxophone and directs a semi-professional band—has been given a difficult mission: to blow louder the horn of the Falcon business jets while the Mirage "choir" is dying down, the victim of the military market collapse. The objective is to increase from 25 to 35 percent the weight of civil aircraft in the company.

This is a difficult challenge in a sector that is particularly sensitive to economic conditions. Especially considering that Dassault, with 1,100 Falcons in use in some 60 countries, already holds 16 percent of the world business-jet base. Thus, after exceeding 30 aircraft per year, sales of the Falcon-50 and Falcon-900 fell to 25 units last year.

The new strategy worked out by Jean-Francois Georges is therefore based on three different registers. Priority goes to product support, whose image needs to be set right. "We must make an effort to improve the lead times and prices of our customer support services. It is no longer enough to have the strongest and fastest planes, and the ones that pilots prefer," Jean-Francois Georges observed.

The second offensive will consist in broadening the market base beyond its traditional clientele of rich VIPs. Business jets are increasingly used for special civil or military missions: observation, listening-in, map-making, calibrating radio-navigation beacons, training crews in electronic warfare. Because of their very strong structure derived from fighter aircraft, and their ability to operate at high speed and low altitude, the Falcons are well-suited for this type of aerial work.

The latest innovation is to develop cooperation. This is almost a cultural revolution for Dassault, which is discovering the delights of cooperation through its partnership with Alenia. The Italian company has a 25 percent participation in the new transcontinental twin-jet, the Falcon 2000, the first flight of which is scheduled for early 1993. A still more ambitious project might be decided within a year and a half, in cooperation with

Asiatics. Not to mention current negotiations with British Aerospace concerning the possible take-over of the "corporate" division.

France: Matra, Renault Partnership Called Rocky
92WS0611B Paris L'USINE NOUVELLE in French
28 May 92 p 23

[Article by Alain-Gabriel Verdevoye: "Despite the Renewal of Their 'Espace' Production Agreements: Simmering Discontent and Bad Temper at Matra and Renault"—first paragraph is L'USINE NOUVELLE introduction]

[Text] Renault is putting pressure on its partner. If it develops other projects, Matra [Mechanics, Aviation, and Traction Company] will have to sell its ideas to other manufacturers. Not that easy.

Officially, relations between Matra and Renault are fine. The two groups just renewed their industrial agreements, which date back to 1983. One year from now, the Renault Espace, manufactured by Matra at Romorantin (Loir-et-Cher) and by Alpine at Dieppe (Seine-Maritime) will reach a production rate of 345 vehicles per day, compared with 260 today. A successor for this unit body vehicle should be introduced in the mid-nineties.

Behind the scenes, however, both sides are complaining. Renault seems to dislike the idea that its partner should earn so much money on the Espace. Mostly, it worries about the quality level. It is not up to Renault's new and very strict standards. Subcontractors, in particular, are said to be dragging their feet. Matra Automobile, too, has a few gripes. The new contract is deemed less "lucrative" than the previous one, even though quantities are expected to make up for this. Renault, wishing to increase its competitiveness, is putting strong pressure on margins. In veiled terms, Renault is blamed for taking advantage of its strong position to put pressure on a partner which is taking all the industrial risks. Matra wishes to relieve that pressure.

Its contacts with other automobile manufacturers would enable it to consider launching a second model. This would be a small monovolume vehicle, a leisure or an electric car. German manufacturers are said to be interested in Matra's unanimously recognized know-how in plastics. The group's automobile division, headed by Jean-Luc Lagardere says it is ready to set up another factory in France.

Until now, all the ideas of the independent automobile company were submitted by priority to Renault. But none of these projects has been adopted until now. Matra is getting impatient: "Renault does not want us to expand, but they should understand that we must ensure our survival," people at Matra complain. They are increasingly worried. Renault intends to develop new vehicles alone, monovolume vehicles smaller than the Espace. For instance, a few months ago, Renault introduced the Scenic, a project derived from the Espace, and designed without Matra. If Matra Automobile wants to guarantee its future, it must invest in new products. True, the company earned 254 million French francs [Fr] last year, for sales of Fr3.9 billion. But the new group

Matra-Hachette, which badly needs money, will keep a close watch on the expenses of its automobile branch.

Germany: DASA Becomes Sole Shareholder in German Airbus Corporation

92MI0640 Bonn DIE WELT in German 13 Jul 92 p 11

[Text] "That's definitely not a bad deal." This was DASA [German Aerospace Agency] spokesman Christian Poppe's response to the announcement by the Bonn aerospace coordinator, Erich Riedel, that the Federal Republic intends to give its 20 percent share in German Airbus GmbH, Hamburg, without charge to the Daimler subsidiary DASA within three months. DASA, which already has an 80 percent holding in German Airbus through the now dissolved MBB [Messerschmitt-Bolkow-Blohm], will thus become the sole owner of the German production company with a 37.9 percent stake in the European Airbus consortium.

In return, DASA will renounce its claims arising from the agreement to provide safeguards against fluctuations in the exchange rate of the dollar, retroactive to January 1992. This guarantee, which was agreed during the merger of Daimler and MBB, could have cost the federal treasury more than 600 million German marks [DM] by 1996, depending on how the dollar rate develops. At the time, the federal government had undertaken to pay compensation for dollar rates between DM2 and DM1.60 for older Airbus models and between DM1.80 and DM1.60 for more recent models. Apparently, DM580 million flowed out of the state coffers into German Airbus in 1990 alone.

As recently as June, the head of DASA, Juergen E. Schrempp, was denying speculation about a complete takeover of German Airbus. There are several reasons why the Munich aerospace company is now stepping in after all in spite of the weak dollar. Firstly, it had become highly questionable whether the compensation payments for fluctuations in the exchange rate would have continued to be forthcoming. After several representations by the U.S. Government, which regarded this practice as unacceptable export subsidies, a court of arbitration in Geneva ordered Bonn to suspend the payments. Although the federal government never recognized this ruling, it simultaneously explored ways of stopping the dollar rate safeguard.

Secondly, DASA made extensive efforts to reduce its dependency on the dollar rate. As Poppe explained "apart from forward exchange dealings with which we limit exchange rate risks, we have also concluded dollar-based supply agreements at home in order to spread the burden more widely. Moreover, we have shifted some of our activities to the dollar area."

The value of the transaction now being agreed also depends to a large extent on the value of the dollar. The higher it rises, the lower the impact of DASA's declaration to the federal government that it will renounce the financial safeguards. At mean annual rates of more than

DM2, it would get the 20 percent package for nothing. Ultimately, however, the crucial factor for DASA was probably the excellent economic situation of Airbus at present, which was underlined again last week by an order from United Airlines worth \$1 billion.

Although German Airbus posted a loss of DM376 million in 1990, it achieved a surplus of DM421 million last year. In the meantime, Hartmut Mehdorn, chairman of the management of German Airbus, is assuming that his company will show a profit even without exchange rate safeguards from the state.

The Bonn aerospace coordinator, Erich Riedl, also mentioned to DIE WELT the gratifying economic situation at German Airbus. The transfer of the remaining shares to DASA, originally agreed for 1996, had been carried out earlier than planned because of the favorable economic development. The complete privatization of German Airbus was an "extraordinarily pleasing conclusion to Bonn's aviation industry policy." With a competitive range of airplanes, Airbus had now flown into the profit zone. The buildup phase of the civil aviation industry in Europe had thus reached a successful conclusion.

Riedl conceded that the disputes with the U.S. had been the "trigger" for the present transaction, but he assumed that there would be no more quarrels in the future once an aviation agreement had been negotiated within the framework of GATT.

French Electronics Industry Suffers Losses in 1991

92WS0672B Paris AFP SCIENCES in French
11 Jun 92 p 13

[Text] Paris—For the first time since 1980, sales for the French electronics industry as a whole dropped in 1991, by 1.7 percent in current French francs [Fr] and 5 percent in francs adjusted for inflation. The Electronics Industries Group (GIEL), the professional trade union to which most electronics manufacturers belong, announced these figures on 11 June.

Sales totaled Fr194.7 billion in 1991, compared to Fr198 billion in 1990. It was a particularly bad year for the entertainment electronics industry (television, video, audio). Even though sales grew 6 percent to Fr15.8 billion, due to an increase in manufacturer and retailer stocks, consumer sales dipped 4 percent in current francs. That is the worst performance entertainment electronics has posted since 1983.

Manufacturers of entertainment equipment are accustomed to price drops. But they also suffered a decline in unit sales in 1991, with sales of television sets down 4 percent and tape recorders down 5 percent. The last French consumer electronics giant, Thomson Consumer Electronics, posted a loss of Fr2.5 billion in 1991.

As in 1990, however, the ratio of exports to imports stayed around 50 percent, which is a much better rate of coverage than in previous years (under 40 percent). The improvement stems primarily from the increase in French production of television sets, which was spurred by the decision of several manufacturers to repatriate certain manufacturing activities that were formerly based abroad.

On the other hand, exports of video games are still negligible compared to the number of imported consoles manufactured by the two Japanese giants in the field, Nintendo and Sega. Imports of their games exploded in 1991, reaching a total value of Fr1.3 billion compared to Fr300 million in 1990.

The year was also a bad one for French manufacturers of electronic components. Their overall sales shrank 10 percent, to Fr21.9 billion, and their sales of semiconductors dropped 17 percent. Only telecommunications industries posted a small growth in sales (4.5 percent), bringing their turnover to Fr25.5 billion.

Europe Said To Be Positioned to Become World Chip Supplier

*92WS0673A Duesseldorf VDI NACHRICHTEN
in German 29 May 92 p 5*

[Interview with the Chairman of the Board of Intermetall Dr. Thomas Fischer by Jens D. Billerbeck]

[Text]

"Europe needs standards so strong that they also will become standards on the world market," says Dr. Thomas Fischer. He is chairman of the board of the Freiburg chip fabricator Intermetall. The head of the ITT subsidiary mainly sees risks for the domestic industry in the pessimistic estimate of its own ability.

[VDI NACHRICHTEN] If you look at your list of customers, you also see the major players of the semiconductor branch. Do you view Intermetall in comparison more as a niche vendor?

[Fischer] There is no question. When you look at our size and the size of our large competitors, it is very clear that we have to specialize. We need to find niches where we direct our focus. We then provide really excellent services there. These services must then be so good that they are also of interest to companies having their own microelectronic resources.

[VDI NACHRICHTEN] These very special circuits require know-how of the potential application. A lot has been said regarding joint ventures with the customers. What is your philosophy, where do you get your ideas for developments?

[Fischer] There are products that come originally from the creative minds of our employees. There are also products that are brought to us entirely from the outside. Of course, most products fall somewhere between these

two extremes. On the one hand, we need to be very well acquainted with our markets and our customers. On the other, of course, even our customers have a very good idea of what we can do and where we can help them. This is an interplay where ideas are brought to us, where we also get informed about product developments. In this way, we get a very good understanding of what is coming our way in the future. This process yields products from a very intensive dialogue with our customers.

[VDI NACHRICHTEN] You fabricate chips in Germany. Is competitive semiconductor production at all possible here over the long term?

[Fischer] I am convinced that it is possible. However, I must add the reservation that it is becoming more and more difficult. Nevertheless, we have consistently followed a plan that has contributed to the fact that we are still a profitable, autonomous company at this location. We have all operations needed for semiconductor fabrication under one roof. Here we have marketing, systems development, product development, and management. This is all at one location so that decisions can be made quickly. Besides, the mask technology is here in the company, the wafer factory, and we assemble the ICs here. As a result, they are then shipped throughout the world from Freiburg. Concentrating all operations under one roof makes fast and short decisions possible. This leads to the situation that we have attractively short development times in product development and correspondingly short turn-around times in the factory. In this way, we can very flexibly adjust to changing customer requirements and to modified products.

[VDI NACHRICHTEN] Many people—even the major players—complain about losses in the industry, but you are making money?

[Fischer] You have to differentiate there. In a memory factory where a single product is manufactured in extremely large quantities, everyone reaches a very similar technical state after a short time. If you want to keep pace there, you have only one choice: to compete economically via economies of scale. We do not just sell areas of silicon, we also sell a large amount of value contained within the implemented system. To produce such semiconductor products and to operate such a semiconductor plant, you do not need the sizes required for memory fabrication. This is where I see a very decisive strategic chance for us. We can survive in this market and make a good profit with considerably smaller fabrication units.

[VDI NACHRICHTEN] There is also a lot of discussion regarding the danger of dependence on the Japanese. This is not only in the area of products but also in the area of manufacturing technologies. How does your manufacturing look? Can you specify proportions of European, American or Japanese manufacturers?

[Fischer] That can most certainly be done. I don't know the numbers offhand. However, one thing is clear. Without the Japanese, manufacturing is not possible

today. Regardless, I see no problem in this. We must also live with the fact in other areas of technology that our economic life is organized according to a division of labor principle. That does not cause me any trouble and I also believe that we in Europe can withstand this competition. Of course, it would be a cause for concern if the European semiconductor fabrication branch dropped below a critical mass so that, for example, it was no longer profitable for the overseas manufacturers of fabrication equipment to keep a service organization in Europe. However, there is one other effect that is very fatal: this pessimistic talk regarding European semiconductor technology. With all the problems that we have, this extremely negative thinking easily results today in a self-fulfilling prophecy. One example comes to mind. We developed two signal processors. One specifically targeted automotive applications and the other was for application in an automobile radio. We were not able to locate customers for these products in Europe while the Japanese were very excited about this technology. They are making products with it. I fear that one day European consumers will not have confidence in what European suppliers can really do.

[VDI NACHRICHTEN] The investment costs in the semiconductor industry are enormous. Are you able to raise this capital within the company or must you rely on government aid?

[Fischer] In the past, Intermetall earned all capital itself. We did not get capital from government aid nor did our parent company provide the capital. It is true that the amount of capital spending is becoming larger and larger. On the other hand, our business must also grow, of course. I believe direct subsidies are bad. In that respect, I am a convinced market economist. On the other hand, if you say that industrial policy of any type or color is bad, that is certainly a short-term view. It is a hollow declaration if you say that we do not have an industrial policy in high technology and, on the other hand, that we do have an industrial policy in agriculture costing ECU50 billion and which everyone agrees is an unhealthy policy. For me, the deciding factor is that a policy is followed, measures are taken that produce a calculable, accommodating market in Europe. Part of this is that you must not look for the cure outside Europe from a declaration of faith. Another part of this is that reliable standards must be set. These would be standards that are so strong on the domestic market that they also become standards in the world market.

[VDI NACHRICHTEN] With regard to the domestic market, does 31 December 1992 have any significance for you or is Europe already a reality for Intermetall?

[Fischer] It has an idealistic significance but it is reality. It is reality. You can see this from the fact that in Freiburg, we have people with 30 different passports under contract. In our business connections, I would venture to say that there are no longer any national borders. We are indeed active on a worldwide basis and have good contacts throughout the world. In terms of

logistics, Europe already exists for us today. In part, the changes are also not so drastic because, unfortunately in a typically European manner, some of the bureaucracy that today is found at the borders is being moved away from the borders into the corresponding main customs offices in the governmental districts. The bureaucracy will never really be eliminated.

Automation Technology Developments To Be Presented at Interkama 92 Conference

*92WS0673C Duesseldorf VDI NACHRICHTEN
in German 29 May 92 p 8*

[Article by Kra: "Computer Science Adds Value to Control Engineering"]

[Text]

Interkama Conference Demonstrates Trends in Measurement and Automation Technology From 5-10 October

A Market of \$20 Billion is Expected in Process Automation in 1992

In industrial automation technology, classic control engineering and computer science are entering a period of symbiosis. The results of these developments in measurement and automation technology will be on view at the upcoming Interkama 92. The promoter claims that this is the largest conference on measurement and automation technology in the world. It will open its doors for the 12th time in Duesseldorf from 5-10 October 1992.

Automation technology cannot keep pace with the fast development cycles of microelectronics. "A new generation of semiconductor components comes on the market at intervals of about three years. Users and manufacturers of automation-technology capital goods cannot economically handle new generations appearing at these intervals," says Fritz Schreiner. He is the president of Interkama 92 and was speaking on 20 May in Wurzburg. Most automated industrial plants would use equipment for at least 10 years. The cause of this is the expensive development of current automation systems. The software end that is gaining more and more importance is not the smallest factor.

"In the past 10 years, the technology that had been predominantly hardware oriented until then transitioned into an information-oriented technology," explained the Interkama president. Before, mechanical, hydraulic and pneumatic solutions dominated in industrial measurement and control engineering. Later came electromechanical and electrical systems using analog signals. Today, digital technology is king. "The system functions are implemented in software. Human-machine and human-process communication takes place via terminal screens." In the language of information technology, process control systems today are hierarchically structured microcomputer/workstation networks. They operate in real time and contain the process data of

object-oriented distributed databases. One result of the avalanche of innovation in recent years is the increasing microprocessor intelligence in field equipment. This intelligence allows sensors and actuators to communicate, emphasized Interkama president Schreiner. In this way, a central control room can configure and provide parameters to intelligent field equipment such as measuring transducers, analysis equipment and positioners.

"Automation technology is a market that is difficult to describe," said Schreiner. The term automation covers a series of very different areas. Interkama will deal exclusively with industrial communications. This area comprises process automation. In this case, this is the automation of plants, e.g., in the crude oil industry, petrochemicals or the ironworks industry. Besides this, process automation comprises other areas: the automation of buildings, mechanical manufacturing lines, and supply networks for electricity, gas, petrochemicals and water.

Process automation forms a focal point for this year's Interkama. "Various market analyses assume a process automation market of \$20 billion in 1992," emphasizes Schreiner. The manufacturers are being forced to enter international markets to an ever increasing degree. Revenues high enough to offset the development costs cannot be achieved on the national market alone.

Growth Predicted in European Semiconductor Market

*92WS0674B Duesseldorf VDI NACHRICHTEN
in German 5 Jun 92 p 1*

[Article: "World Semiconductor Trade Statistics Predicts Growth in Semiconductor Market With Regionally Varying Trend; Japan Losing Shares in World Chip Market"]

[Text] Duesseldorf, 5 Jun 92 (VDI-N, jdb)—The world market for semiconductors has grown this year by about 7 percent to \$58.3 billion. This was reported by World Semiconductor Trade Statistics (WSTS) at its spring meeting in Wiesbaden. Jean Philip Dauvin, chairman of European WSTS, sees strong regional differences in this growth: While the Japanese market is shrinking by 1 percent to \$20.7 billion, Asia is growing by 18.7 percent to \$9.7 billion, the U.S. by 10.6 percent to \$17 billion, and Europe by 7.7 percent to \$10.9 billion in 1992.

Dauvin makes the general economic situation in Japan primarily responsible for the weakness of the Japanese market. Added to this was substantial overinvestment primarily in the area of entertainment electronics, which will begin to show definitively not until toward the end of the year because of the general weak economic situation.

The world market shares of the individual regions also shifted on the whole. The losers here are Japan and Europe, whose share shrunk slightly to 34.5 and 18.2 percent, respectively, while the U.S. strengthened its share to 29.3 percent and Asia reached 18 percent in 1992. With this the Asian region increased so markedly

already for the third time, and for Dauvin it is only a question of time when the Asians will run rings around Europe: "Market researchers are just arguing whether it will be already in 1993 or not until 1995."

The U.S. is relatively well off in international terms. Dauvin attributes this to various effects. For one thing he sees a definite pickup in the computer industry, which at present can produce a replacement demand for many old main-frame computers. For another, the U.S. automobile industry triggered a marked sudden rise in demand for semiconductors, because companies like Chrysler and General Motors were able to grow strongly while Japanese imports declined. This possibly has to do with Bush's visit to Japan last year, the WSTS authority says.

WSTS's long-range forecast for the period to 1995 predicts average annual growth of 9 percent for the market, where a pronounced pickup is to occur already in 1993 with an expected 13.5 percent plus. Memory chips, that are to increase by 19 percent, have a superproportional share in this.

Thus, after a few weak years WSTS expects a good showing again for memories, but it is exactly dynamic RAMs (DRAMs) that are developing into a headache for chip manufacturers. The memory capacity per chip quadruples with each succeeding generation. The demand for greater memory capacity is growing, but not in the same proportion, and the sales figures are dropping with this. Siemens spokesman Klaus H. Knapp explains his firm's new line thus. One wants to produce as few DRAMs as possible in order to keep the losses low, but as many as necessary in order to have the technology available.

The discussion of a new chip factory also ended for Siemens with the decision to increase in the future the manufacture of intelligent logic circuits by means of the megatechnology. The 64-megabit chip, which was developed together with IBM, will be produced in one of the existing factories, Knapp says.

Finland: Nokia's First Quarter Results Announced

*92WS0678GG Chichester INTERNATIONAL
TELECOMMUNICATIONS INTELLIGENCE
in English 29 Jun 92 p 20*

[Text] Finland's Nokia Group reported net sales of FM4,856 million for the first four months of 1992 (ended April 30, 1992), a 3.7 percent drop on the same period of 1991. Adjusted for acquisitions, divestments and exchange rate fluctuations, sales fell 11 percent, the company said.

All five Nokia business groups had budgeted for continuing weak economic development, especially in Finland, and all but one of them, Nokia Consumer Electronics, exceeded their net sales targets. Consumer Electronics was hit by a general negative development of markets in its sector, Nokia said, especially in Germany, Italy, France and Sweden.

Nokia—Net Sales by Business Group (FMm)

	Jan-Apr 92	Jan-Apr 91	% chg
Consumer Electronics	1,578	1,837	-14.1
Mobile Phones	881	860	+2.4
Telecommunications	669	570	+17.4
Cables and Machinery	1,377	1,464	-5.9
Basic Industries	416	534	-22.1
Inter-business group eliminations	-65	-221	
Total	4,856	5,044	-3.7

The Group's operating results for the four-month period was a loss of FM178 million, compared with an operating profit of FM119 million for the same period of 1991. However, this was better than the company has forecast, and does not include profit from sales of fixed assets, which totaled FM87 million in the result for the first four months of last year.

The loss before tax and minority interest was FM280 million compared with pre-tax profit of FM24 million in the first third of 1991.

The net result was a loss of FM326 million versus profit of FM274 million a year earlier which included a FM314 million capital gain from the sale of Nokia's computer division.

In May 1992, Nokia acquired the remaining 24.9 percent shareholding in the UK mobile phone company Technophone Limited. The company has also agreed with Tandy to establish a joint venture in Texas to manufacture mobile phones (*see this issue under Americas*).

France's Framatome Announces 1991 Results

92WS0704A Paris AFP SCIENCES in French
18 Jun 92 p 17

[Unattributed article: "Framatome [Franco-American Nuclear Construction Company]: 1991 Net Result of 986 Million Francs [Fr]; 500 Jobs To Be Eliminated in 1992"]

[Text] Paris—Framatome, the world's leading nuclear reactor manufacturer, had a net result (the group's share) of Fr986 million for 1991, i.e. almost the same as in 1990 (Fr984 million), for sales of Fr14.17 billion (a 4.4 percent increase), its chief executive officer, Mr. Jean-Claude Leny, announced on 16 June.

The group will eliminate some 500 jobs, Mr. Leny also announced, explaining that it was necessary to "ensure the competitiveness" of the group "in an extremely tense national and international environment."

According to Mr. Leny, the year 1992 "gives no indication of any progress for the group, as the backlog of orders totaled about Fr33.17 billion on 31 December 1991, i.e. 4.55 percent less than the Fr34.75 booked one year before." Framatome's net result "could reach about

Fr900 million, i.e. 9 percent less than in 1991, mostly because of lower nuclear equipment sales," Mr. Leny indicated.

In 1991, the nuclear sector accounted for a slightly larger share of Framatome sales (66 percent), while the share of connectors decreased to 22 percent. The mechanics sector maintained its position at 10 percent of sales.

France: Matra, Northern Telecom Establish Telecommunications Partnership

92WS0706H Chichester INTERNATIONAL
TELECOMMUNICATIONS INTELLIGENCE
in English 13 Jul 92 pp 4-5

[Article: "NorTel and Matra Establish Telecom Partnership"]

[Text] At a press conference held in Paris on July 2, Northern Telecom and Matra Communication, the telecommunications division of Matra, the French defence electronics group, announced a strategic alliance.

The alliance, which is subject to approval by the French Government and other authorities, will enable Northern Telecom to continue its European and worldwide business development, and Matra to support its strategy for international telecom business growth.

Under the terms of the agreement, NorTel will pay US\$265 million to acquire an initial 20 percent direct holding in Matra Communication shares from 1995. NorTel is also negotiating to take a minority stake in a new holding company which will merge Matra with Hachette, the French publishing company, also controlled by the Lagardere Group, Matra's parent company. The new holding company will manage Matra Communication.

Matra is also offering to acquire the 18 percent stake held by the French investment bank, Paribus, in its communications subsidiary for Fr295.70 a share. The same offer has been extended to other minority public shareholders with 12 percent of Matra Communication.

After 1995, Northern Telecom will own at least 20 percent of Matra Communication, which will also be owned by Matra Hachette (50.1 percent), itself 40 percent-owned by MMB (of the Lagardere group) and AEG (10 percent). Northern Telecom could, eventually, end up with 39 percent of Matra Communication, or even 49 percent depending on AEG's reaction.

Other terms of the deal include:

- the formation of a 50/50 joint-venture between NorTel and Matra Communication in GSM/PCN radio communications. NT Matra Cellular Systems will be responsible for developing and supplying cellular infrastructure switching and radio equipment for public networks using ETSI GSM-900 and DCS-1800 specifications and the Radiocom 2000 specification.

The joint venture will combine Matra's radio base station technology and NorTel's digital cellular central office switching.

Matra is also a member of a consortium comprising Orbitel, Ericsson and Telettra formed to develop infrastructure and terminal equipment for networks built to the GSM standard. Contracts were placed by France Telecom and Racal Telecom in 1987 with this consortium for the development of networks for France and the Vodafone network in the UK.

In 1989, France Telecom commissioned Matra and MET (the Matra-Ericsson switching equipment joint venture) to build a pilot digital cellular communications network to serve 10,000 subscribers.

The same year, the consortium was selected to supply GSM systems for administrations in Italy, Switzerland and Spain.

In June 1991, Matra Communication and AEG of Germany announced a collaborative agreement which involved a transfer of ownership of some AEG companies in return for a stake in Matra Communication and joint-development of mobile communications equipment. This agreement covers the business radio communications and cellular mobile market sectors, with particular emphasis on the digital cellular handset and specialist business system markets (see ITI Issue 299).

Matra also has an agreement with Orbitel (now 50 percent-owned by Ericsson) covering cooperation in the development of telepoint terminal and infrastructure equipment. In October 1990 the two companies were selected by France Telecom to supply base stations and terminals for part of FT's Pointel trial in Strasbourg. This experimental service was inaugurated a year later. Matra/Orbitel, GPT and SAGEM provided the equipment. The service is known locally as Bi-Bop. Effects on this agreement are not known.

Northern Telecom itself is involved in another digital cellular joint venture—with Motorola. Earlier this year the two companies established Motorola-NorTel Communications to sell and service cellular telephone networks throughout the U.S., Canada, Central and South America and the Caribbean.

- the development of the Matra Communication and NorTel PBX business in France. NorTel will transfer its existing PBX marketing, sales and service organisations into Matra Communication. The companies intend to coordinate product and sales policies in

France and to develop standard interfaces between their respective PBX product ranges to enable customers to benefit from NorTel's Meridian 1 PBX range and Matra's Matracom 6500, in addition to advanced networking applications.

It is not known how the Matra/Northern Telecom alliance will affect Matra's other PBX activities. The company is already the exclusive supplier of PBXs to AT&T's customers in France and French overseas possessions. The agreement covers the 6500 and allows the product to be interconnected with AT&T's global network. The 6500 can also be interfaced with AT&T's Definity range of PBXs, most of which are installed in the U.S.

In addition, Matra owns Intecom (acquired from Wang Laboratories in 1990) which manufactures a range of PBXs from 100 to 21,000 voice/data lines—the Telari and Integrated Business Exchange (IBX).

- the proposed formation of a centre of excellence in France for telephone sets;

- the formation of a 50/50 joint venture between Northern Telecom and Matra Communication to develop their respective Public Network businesses in France. In particular, the Public Networks joint venture will have responsibility for marketing Northern Telecom's packet-switching and transmission products in France.

This part of the agreement clearly omits public switching which is presumably excluded because of the MET joint venture company.

Matra is a leading French diversified industrial group incorporating defence, aerospace, communications and transport activities which constitutes the high technology segment of the Lagardere Group. Matra Group sales in 1991 amounted to US\$4.4 billion.

Matra Communication reported sales in excess of US\$1.2 billion in 1991. Among its range of telecommunications operations, the company has about 20 percent of the private branch exchange (PBX) market in France and is one of the leading suppliers of telephone sets and cellular mobile terminals to France Telecom and other major European customers.

Press Reports DASA Purchase of Fokker Appears Final

92WS0752B Paris *LE MONDE* in French 27 Jul 92 p 17

[Unattributed article: "Hard-Won Agreement for the Takeover of Fokker by DASA: Netherlands Government Has Given Its Green Light"]

[Text] The Hague—After five months of difficult negotiations, the takeover of the Netherlands aircraft builder Fokker by the German DASA (Deutsche Aerospace)

industrial complex seemed to have reached a final outcome on Friday, 24 July. However, the negotiations almost ran into a roadblock in mid-July when the Netherlands government, which holds 31.6 percent of Fokker stock and which is thus the company's largest shareholder, stepped in to declare that the agreement plan established by that time was inadequate. Prime Minister Ruud Lubbers himself made it quite clear on 14 July that without an improved agreement the government would oppose the merger—which provoked lively criticism from DASA.

The new agreement in principle with which the three parties concluded negotiations on 24 July appreciably improved Fokker's position within the future European aviation conglomerate. Although DASA obtains 51 percent of Fokker stock, the Netherlands government will be able, thanks to a financial aid fund, to retain some influence on the important decisions concerning Fokker's development. Also, 49 percent of the added value of the 65- to 130-seat planes built by Fokker will be deposited to the account of the Netherlands company. The assembly activities of the planes, currently built by Fokker, will remain in the Netherlands. However, the Netherlands did not succeed in obtaining guarantees relative to the Fokker 50 turboprop which will have to compete with similar machines from Aerospatiale and Alenia, also members of the holding company. And finally, the eight-year right of veto for important decisions regarding Fokker, on which the Netherlands government insisted so strongly, was reduced to three years, in the face of the categorical refusal of DASA's president. The price of the takeover has not yet been fixed; however, it will probably be in the neighborhood of Fr3 billion.

EAST-WEST RELATIONS

EC Commission Offers Grants To Stop Eastern European Brain Drain

92BR0510 Rijswijk POLYTECHNISCH
TIJDSCHRIFT in Dutch May 92 p 7

[Article by Willem Schoonen (Brussels): "EC Wants To Prevent Emigration of East European Scientists"]

[Text] Over 600 scientists from Central and Eastern Europe listened to EC Commissioner Pandolfi in Budapest last week as he presented a new grants program. The EC Commission is to set aside 130 million guilders for the exchange of scientists between East and West.

Using that amount, the European Commission hopes to offer close to 2,000 grants in the coming year. The grants will go to eastern European scientists who will spend three to six months in a western European institution, and to western European academics to lecture for a few months in an eastern European university. Applications can be made by scientists from any central or eastern European country with whom the EC has a treaty. At the

moment, this includes Poland, Czechoslovakia, Hungary, Romania, Albania, and the three Baltic states.

The grants program is in addition to the existing cooperation programs with the former East Bloc. Short-term grants have been chosen to ensure that the scientists will return to their own countries. According to the EC Commission, slowing down the brain drain is in the interests of both Eastern and Western Europe. After all, massive emigration by scientists would strongly impact rebuilding the economy.

The countries of the former Soviet Union fall outside the grants program. However, a new initiative is being worked out for the Commonwealth of Independent States (CIS). Germany and the United States have decided to establish a nuclear physics research institute in the former Soviet Union. Now that its establishment is almost complete, thoughts are being directed toward similar action for scientists from other civilian branches of physics.

According to a spokesperson from the EC Commission, interest is enormous among eastern European scientists for the grants program which has now been launched. Researchers still have until 7 August to send in their project proposals.

Dutch Participate in Hungarian Multidisciplinary Research Center

92BR0511 Zoetermeer WETENSCHAPSBELIED
in Dutch May 92 p 24

[Article: "The Netherlands Takes Part in 'Budapest College'"]

[Text] Minister Ritzen [of education and science] is making 300,000 guilders available for an eastern European research institute which was set up in Budapest last year. In exchange, Dutch scientists will be allowed to conduct research there. The purpose of this "center of excellence" is to support scientific development in both Eastern and Western Europe. Furthermore, it should also persuade scientists from Central and Eastern Europe not to emigrate.

The "Budapest College" will offer an international and interdisciplinary working environment to prominent scholars such as the world famous economist Janos Kornai, and to promising post-doctoral scientists. The organization is comparable to well-established research institutes in Princeton, Stanford, Triangle Park, Berlin, and Wassenaar (the Netherlands Institute for Advanced Studies, NIAS). The college is the first institute for advanced studies in a former East Bloc country. The aim is to allow it to develop into a European research center.

The contribution from Minister Ritzen is meant to widen support for the institute and to enable Dutch scientists to participate. This is important because the College constitutes a gateway to Central and Eastern

European research for Dutch scientists. In addition, it is an opportunity for Dutch scientists to meet prominent western scholars.

The amount of 300,000 guilders is intended to go directly to the college. NIAS is receiving an extra 125,000 guilders to allow it to award grants for higher research to central and eastern European scientists. In return, the Netherlands will be given a place on the college's management board. NIAS Director Prof. Dr. D.J. Van de Kaa will occupy this position, with writer Gyorgy Konrad, among others.

The existence of the college is guaranteed for the next five years by private foundations and governments from the Netherlands, France, Austria, Switzerland, Germany, Hungary, and soon Sweden. The scientists affiliated with the college will be able to carry out their chosen independent research at the institute for 10 months. In addition, there will be several annual joint priority research projects, such as the changeover from a planned to a market economy, environmental research, and research into migration patterns, refugees, and minority groups.

In the Fall of 1992, the first 20 fellows, including 10 scientists from Central and Eastern Europe, will begin their research activities at the College.

EUROPE-ASIA RELATIONS

Germany, Japan Conclude Scientific Cooperation Agreement

92MI0579 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 3 Jun 92 p 2

[Text] The German Research Association (DFG) and the Japan Society for the Promotion of Science (JSPS) have concluded an agreement on the promotion of cooperation between the scientists of the two countries.

This new agreement brings the number of bilateral agreements between the DFG and partner organizations

to 15 with European and 18 with non-European countries. The new agreement covers the promotion of joint research projects, support for bilateral seminars and symposia, and the exchange of scientific information. The agreement will run for an initial period of five years and can then be renewed annually. The Japanese will finance the program with special funding from the Science Ministry, and the Germans out of the DFG budget.

France's CNRS To Send Researchers to Japan

92WS0703C Paris AFP SCIENCES in French 18 Jun 92 p 1

[Unattributed article: "Five French Researchers in Japan Beginning in August"]

[Text] Paris—The National Center for Scientific Research (CNRS) announced on 15 June that it will be sending five researchers to Japan in August.

These scientists, who have just completed an intensive Japanese-language course, will work in Japanese government laboratories and reinforce the CNRS-Japan office established in 1991 by CNRS's director-general, Mr. Francois Kourilsky, in the context of cooperation agreements signed in 1990 with the three Japanese ministries concerned.

The agreement between CNRS and the Japanese Ministry of Science and Culture (MONBUSHO) involves the space, life, and social sciences, engineering, nuclear and particle physics, chemistry, physics, and mathematics.

The agreement with the Science and Technology Agency (STA) deals with information and scientific and technical policy, advanced materials, heavy ion physics, and synchrotron radiation. The agreement with the Agency for Industrial Science and Technology (AIST), under the Ministry of International Trade and Industry (MITI), involves the study of the environment, new materials, and molecular systems, and research in microelectronics, nanoelectronics, and computer science.